

Final

**Environmental Assessment for
Explosives Ordnance Disposal Proficiency Training Range
Wright-Patterson Air Force Base**

ECAS Contract No. FA4890-04-D-0006, Task Order Q707

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Prepared for:

Wright-Patterson Air Force Base
88th Air Base Wing
Civil Engineer Directorate
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**FINDING OF NO SIGNIFICANT IMPACT/
FINDING OF NO PRACTICABLE ALTERNATIVE FOR
EXPLOSIVE ORDNANCE DISPOSAL PROFICIENCY TRAINING RANGE
WRIGHT-PATTERSON AIR FORCE BASE, OHIO**

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA), 40 Code of Federal Regulations (CFR) 1500 - 1508, Department of Defense Directive (DoD) 6050.1 and Air Force Regulation (AFR) 32 CFR Part 989, the 88th Air Base Wing (ABW) Civil Engineer Directorate, Asset Management Division prepared an Environmental Assessment (EA) to identify and assess potential effects of the construction and operation of a new Explosive Ordnance Disposal (EOD) proficiency training range at Wright-Patterson Air Force Base (WPAFB), Ohio. This EA is incorporated by reference into this finding.

Purpose and Need

The US Air Force (USAF) identified the need to establish and operate an EOD proficiency training range at WPAFB for the purpose of training EOD specialists as required by Air Force Instruction (AFI) 32-3001, Air Force Materiel Command Supplement 1, *Explosive Ordnance Disposal Program*, 2 May 2006. An EOD range is required in order to conduct the proficiency training operations in accordance with Air Force Manual (AFMAN) 91-201, *Explosives Safety Standard*, 17 November 2008.

Description of Proposed Action and Alternatives

This EA evaluates four proposed locations for the EOD range and potential impacts to critical resources resulting from both construction and long-term operation of the proposed range. The construction of the range includes the installation of an engineered barricade for control of ejected debris, two bunkers for staging training ordnance and initiators, an access road and parking area, with the entire perimeter being fenced off. The training would be conducted at a maximum of three times per week for up to eight hours per training event with one detonation per hour during training exercises. Actual use of the range is expected to occur approximately one day per week with a single detonation per training event.

Skeel Avenue Location (Proposed Action):

The proposed action consists of construction and operation of the described EOD range at the preferred location, also referred to as the Skeel Avenue site. This site is located in an undeveloped, generally flat field bordered to the south by the Huffman Prairie (separate location from Huffman Prairie Flying Field), to the east by Skeel Avenue, to the north and west by the WPAFB airfield. The project site is located within the 100-year floodplain as determined by the United States Army Corps of Engineers (USACE). Access to the site would be off of Skeel Avenue, using the pre-existing gate located southeast of the airfield and a new gravel entrance and parking area which would be constructed for the project. The site is considered to pose the fewest potential environmental consequences, as described in the EA, and is therefore selected as the proposed location. Three alternative locations are also considered in the EA as described below.

Alternative 1: Former EOD Range

The former EOD site, located in the southwest end of Area C, is bordered by Riverview Road to the south, and woodlands and wetlands to the north, east and west. The site is located approximately 335 feet east-southeast from Mad River, and portions of the site are within the 10- and 100-year floodplains, as determined by the USACE. Currently the site is heavily wooded and no structured activity is conducted in the area. A fence with a locked gate surrounds the 5-acre area, prohibiting unauthorized access. The location was previously used for open detonation activities and thermal treatment from approximately 1950 until 1990. The site was operated as

a Resource Conservation and Recovery Act interim status facility during its last year of operation and was remediated and closed in May 2000.

Alternative 2: Hebble Creek Road Site

This alternative is an undeveloped, generally flat field bordered to the east by HPFF, to the south by Hebble Creek Road, to the west by a woodlot and to the north by Marl Road. The project site is located within the 100-year floodplain as determined by the USACE. A gravel entrance and parking area would be constructed, as well as a new fence and gate to provide access control to the proposed training area.

Alternative 3: Sand Hill Site

This alternative is located at the extreme north edge of WPAFB. The property is generally undeveloped and currently used for ancillary activities by the base, and for agricultural activities through a use agreement. The site is located within close proximity to a residential development located to the north and northeast. Access to the proposed location would be constructed providing ingress/egress to the EOD area from State Route 235 (Chambersburg Road) via a gravel entrance and parking area.

No-Action Alternative

Under the no-action alternative, the proposed action of construction and long-term operation would not be implemented. The proposed action is designed to satisfy mission critical activities and mandatory training requirements, therefore eliminating training is not an option. The no-action alternative would result in EOD operations being relocated to an off-base location.

Alternatives Considered but Eliminated from Further Study

Dayton Bomb Squad Range

Since the beddown of 88 ABW/CED in October 2007, the Dayton Bomb Squad allowed WPAFB EOD personnel to temporarily train and dispose of hazardous ordnance at their range facility located on South Gettysburg Avenue in Dayton, Ohio. EOD personnel must transport explosive materials across public roads and interstates at a distance of 20 miles for approximately 30 minutes one way. This is not a reliable or preferred long-term option based on the transportation, safety and staffing factors summarized in section 2.3.1 of the EA.

Off-base Department of Defense Range

A second alternative would consider using an off-base DoD EOD existing range. The closest EOD range is located at Fort Knox, Kentucky, which is a 3 hour, 205 mile drive over public roads and interstates. This alternative is not viable for all the same transportation and safety reasons identified for the Dayton Bomb Squad Range.

Landfill 11 Site, Area C

The EOD range would be located on top of Landfill 11, which is located north of Riverview Road. This location was removed from consideration due to impact to the landfill cover, which would require expensive engineering and construction measures to mitigate. Past surveys have documented methane gas emissions coming from the landfill, and the 500 ft EOD clear zone overlaps the Mad River.

Area B Runway

This site is located in Area B behind the National Museum of the USAF in close proximity to the museum and public housing. Operations would also impact the Air Force Research Laboratory laser test range and would be in an area open to public view and where public activities occur such as the TATOO and WW I and II aircraft fly-ins. In addition to the above considerations, transportation of munitions would be conducted across public roadways from Area C to Area B.

Prairie Trace Driving Range, Area C

The Prairie Trace Driving Range is located north of Skeel Avenue. Locating the EOD range at this site would require relocating the Prairie Trace Driving Range. The site is located approximately 1,600 ft from the Brick Quarters, and the perimeter of the 500 ft EOD clear zone is in close proximity to both the fitness jogging trail and Skeel Ave.

Taxi-Way Site, Area C

This eliminated location is located east of the HazCargo Pads south of Runway 23L/05R. Locating the site at this location would result in the EOD operation being in both the primary surface area of Runway 23L/05R and in close proximity to the parking spot of a Priority 1 resource. Significant impacts would result for daily airfield operations in that foreign object disposal (FOD) sweeps of the runway would be required after each detonation.

Environmental Consequences

Natural Resources (EA Section 4.2): The United States Fish and Wildlife Service (USFWS) identified minor adverse impacts to wildlife in the vicinity of the proposed action. Construction and operation of the EOD range would eliminate up to 16 acres of tall grass prairie, which provides habitat for a variety of wildlife and vegetation. The USFWS concurred that species of concern, including the Indiana bat and the eastern massasauga rattlesnake, would be adequately protected, provided that construction and operation of the EOD range is conducted in observance of operational controls such as preferentially scheduling construction, maintenance and operations of the range to those conditions under which the species are less active, as outlined in the EA. The USFWS concluded that alternative locations #1, #2 and #3 do not pose significant impacts to natural resources, provided best management practices of minimizing tree removal (alternative #1), and mowing practices which allow for 8 inches of vertical clearance, be observed. The Integrated Natural Resources Management Plan will be amended to incorporate mitigation measures required to minimize impact to endangered species potentially displaced by development of the EOD range at this location.

Water Resources (EA Section 4.3): Under the proposed action and alternatives there would be no direct impacts to surface waters. Impacts to surface water quality from erosion during site preparation and excavation activities are expected to be minimal, based on the area to be disturbed (generally less than 1 acre), and the limited extent of site preparation required to construct the EOD range. Impact at all locations is considered to be minor with appropriate erosion control measures. The relatively flat topography will serve to minimize storm water damage and run-off during construction. Similarly, significant storm water runoff is not expected during operation of the EOD site. No wetlands are located proximal to the preferred location or alternative locations 1 and 2. Wetlands located down slope of alternative location #3 will require protection through proper erosion control, and may require additional mitigation if required by the Ohio EPA. While the preferred location and alternative locations 1 and 2 are within the 100-year flood plain, the open nature of the proposed structure will not adversely affect the storage capacity of the floodplain. The Miami Conservancy District has been consulted and does not object to the locations for the proposed EOD range.

Based on available studies as described in Section 3.3.1.2 of the EA, the depth to ground water at the preferred location and alternative locations 1 and 2 is approximately 5 feet below ground surface. This thickness of

unsaturated soil above the water table provides a limited buffer for potential ground water impact that may result in accumulation of residue from operation of the EOD range. The isolation distance between ground surface and ground water at alternative location 3 is significantly greater, and poses little potential for impact. Measures consistent with standard housekeeping protocols will limit the potential for consequences to the ground water resource at the preferred location and alternative locations 1 and 2 as summarized in section 4.3.1.1 of the EA.

Hazardous Materials/Waste, Stored Fuels and Installation Restoration Program (IRP) Sites (EA Section 4.4):

With proper housekeeping and maintenance, the proposed action and alternatives will not generate hazardous waste at the preferred or alternate locations. Cleanup of materials subsequent to each training event will minimize the potential for hazardous materials present at the site. No hazardous materials or fuels will be stored outside of scheduled training events, and residue from detonations will be collected on a routine basis and removed from the area for proper disposal. As RDX (plastic explosive) and TNT are the primary residues expected, regulated hazardous wastes are not anticipated to be generated from the proposed operation of the EOD range. The proposed action and alternatives for the EOD range pose no significant impacts to IRP sites.

Land Use (EA Section 4.5): The construction and operation of the EOD training facility are a consistent land use at the preferred location and alternative location #1. The preferred location is approximately 3,000 feet west of a historic residential district, referred to as the Brick Quarters District. The State Historic Preservation Officer (SHPO) at the Ohio Historic Preservation Office (OHPO) has been consulted on the efficacy of establishing the proposed action in close proximity to these historic features. Consultation resulted in identification of potential noise impacts which may affect the experience at both the HPFF and the historic Brick Quarters District. A Memorandum of Agreement (MOA) has been executed, which satisfies the concerns of the SHPO and resulted in acceptance of the preferred location as suitable for development of the EOD range.

Soil Resources (EA Section 4.6): Under the proposed action and alternatives, only minor short-term impacts resulting from soil disturbance are expected during site preparation and excavation activities. Impacts would be minimized because the area requires less than 1 acre of disturbance beyond mowing and the sites are primarily flat, requiring little land shaping to construct the range. Erosion control would be used during construction activities. The potential impacts are considered to be minimal.

Cultural and Historic Resources (EA Section 4.7): Consultation with the SHPO at the OHPO was conducted to address concerns associated with noise and vibrations expected to be generated during operation of the EOD range. Concerns were raised regarding potential impacts at the preferred location and alternative #2. The vibrations expected from detonations were determined through blast modeling to pose no risk to the structural integrity of the historic Brick Quarters District or the HPFF. Concerns regarding noise have been adequately addressed through the MOA executed between the OHPO and the USAF. No potential impacts were identified at alternative locations #1 and #3.

Air Quality (EA Section 4.8): Under the proposed action and alternatives, there would be minor short-term impacts to air quality during construction. Impacts from construction activities include the generation of fugitive dust and particulates from the removal and grading of soil, excavation operations, and other associated construction activities. In addition, there would be minor, short-term emissions from vehicles that would travel in the construction area. During construction, dust suppression measures would be used to minimize fugitive dust emissions. As operation of the facility on the prescribed schedule would not meet the requirements of a de minimus emissions source, WPAFB would be required to coordinate with Ohio EPA to obtain a Permit to Install and amend the installation Title V Permit to allow increased emissions during EOD operations.

Noise (EA Section 4.9): Under the proposed action and alternatives, there would be minor impacts on ambient noise from site preparation, excavation, and construction activities. Impacts would be short-term and minor because these activities would be carried out during normal working hours. The preferred location for the EOD range is southeast of the main runway. A 3,000 foot radius at this location encompasses mostly grassy field, airstrip and base roadways. Under the Air Installation Compatible Use Zone, the preferred location falls under

80dB-A Day-Night Average Sound Level (DNL) contour, as determined in the 1995 study. Implementation of the measures outlined in the MOA will adequately address minor impacts that may be associated with development of the EOD range at the preferred location. The National Park Service identified potential impacts to the overall experience of the visitors to the HPFF resulting from possibly locating the EOD range at the preferred site and alternative #2. The actual schedule of EOD training is expected to be limited such that significant disturbance to the visitors' experience is unlikely. The potential impact is considered to be low at both locations. Alternative location 1 is remote from sensitive receptors and is not expected to pose significant impacts. Potential noise impacts are considered to be moderate for alternative location #3.

Health and Safety (EA Section 4.10): Under the proposed action and alternatives, there would be potential minor impacts to workers during construction activities. Impacts associated with construction activities would be minimized by adherence to applicable safety standards. Potential impacts due to operation of the EOD range will be minimized by adhering to the safety requirements of AFMAN 91-201. The preferred location is within the arc of 3 HazCargo Pads and 2 stubs, which are periodically used to stage explosives off-loaded from aircraft for up to 3 days. The infrequent use and ability to pre-schedule activities, in conjunction with both the HazCargo pads and the EOD range, allows for a high level of coordination between the two operations. The potential effect on overall health and safety is minimal.

Socioeconomic Resources (EA Section 4.11): Under the proposed action and alternatives, there would be short-term and long-term beneficial impacts to the local economy from construction-related employment, temporary and permanent staff relocation to the area, and the purchase of goods and services. Consultation with the SHPO at the OHPO was conducted to address potential community concerns regarding the potential for noise and vibrations generated during operation of the EOD range to influence local quality of life and property values. Potential noise impacts have been adequately addressed through the MOA executed between the OHPO and the USAF, and mitigated conditions have been determined to pose no significant adverse effects on the socioeconomic conditions of the residential development at the Skeel Avenue location. Concerns raised regarding the potential for noise disturbances at alternative location #2 may discourage tourism and associated revenue from visitors to the HPFF if this site is selected. Implementation of the MOA between the USAF and the OHPO would adequately mitigate the potential impacts at this location.

Transportation/Traffic (EA Section 4.12): Under the proposed action and alternatives, there would be negligible short-term impacts for traffic interruption in the project area during construction at the preferred location and alternative locations #1 and #2. Transportation of hazardous materials would be confined to roadways within the perimeter of WPAFB, minimizing exposure of civilians to explosive materials and reducing the regulatory burden during transportation. Implementation of alternative #3 or the no-action alternative would result in the need to transport explosives on public roadways, thereby increasing the regulatory requirements and exposure of civilian populations to potential risk. Coordination of air traffic control operations with EOD training at the preferred location would be required in order to use the HazCargo pads on the airstrip. Only minimal impact is expected, as adequate coordination is likely due to the infrequent and highly synchronized nature of both operations.

Utilities (EA Section 4.13): No permanent power or other utilities are required for operation of the range. No adverse impacts are expected from locating the EOD range at the preferred location and alternative locations #1 and #3. Alternative location #2 requires the relocation of an existing overhead line and multiple utility poles. Impact of this relocation is primarily based on cost and considered to be minimal.

Environmental Justice (EA Section 4.14): Alternatives #1 and #2 are removed from areas with residential communities and would have minimal or no environmental impacts on environmental justice. The preferred location is within 3,000 feet of a residential housing complex; however, the residents are primarily comprised of persons engaged in military activity and are accustomed to noise associated with activities inherent at military installations. In addition, the MOA executed with the SHPO adequately addresses impacts associated with construction and operation of the EOD Range at this location.

Alternative location #3 is located within 3,000 feet of a residential community of low to middle income residents. A letter submitted during the comment period by a resident of the nearby subdivision in response to the public notice raised concerns about cumulative noise and its potential impact on already flagging property values. Potential impacts are considered to be moderate at this alternative location.

Agency Consultation

In accordance with NEPA, 42 U.S.C. §4321 et seq. (1969), informal consultation was solicited with applicable agencies to seek input on the likelihood of environmental or other impacts resulting from the development of the proposed action. A summary of the outcome of consultation efforts with pertinent agencies is included as Appendix A of the EA.

Public Notice

A public notice was posted in the *Dayton Daily News* on 10 April 2009. The comment period was held from 10 April 2009 until 10 May 2009. A letter submitted during the public comment period by a resident of the subdivision located proximal to alternative location #3 raised concerns about noise and its potential impact on flagging property values. Potential impacts are considered to be moderate for alternative location #3.

Finding of No Significant Impact (FONSI)

The proposed action and alternatives are to construct a new EOD proficiency training range at the Skeel Avenue Site in order to support the training mission for EOD personnel and comply with the explosive safety requirements of AFMAN 91-201. Under the no-action alternative, no improvements would be made and training activities would be conducted at a location other than WPAFB. Based upon my review of the facts and analysis contained in the EA, which is hereby incorporated by reference, I conclude the proposed action and alternatives and the no-action alternative will not have a significant impact on the natural or human environment. An environmental impact statement is not required for this action. This analysis fulfills the requirements of the NEPA, the President's Council on Environmental Quality regulations, and 32 CFR 989.

Finding of No Practicable Alternative (FONPA)

Taking the above information into consideration, pursuant to Executive Order (EO) 11988, *Floodplain Management*, and the authority delegated by Secretary of the Air Force in Order 791.1, I find there is no practicable alternative to conducting the proposed action or alternatives in the floodplain, and the proposed action and alternatives include all practicable measures to minimize harm to the natural or cultural environment. This finding fulfills both the requirements of the referenced EO and the Air Force EA Process (32 CFR 989.14) for a FONPA.



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Date: 1/8/2011

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Ohio Department of Natural Resources (ODNR)

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Ohio Historic Preservation Office (OHPO / SHPO)

Consultation

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Other Correspondence

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Appendix B Sampling and Analysis Plan

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Appendix D Air Quality Calculations

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1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The US Air Force (USAF) has determined that it is critical to its mission to establish and operate an Explosive Ordnance Disposal (EOD) proficiency training range at Wright-Patterson Air Force Base (WPAFB). Historically, EOD activities have been conducted within the boundaries of the base for the purposes of training. EOD operations were conducted by the Army on WPAFB from the 1950s to 1990 at the former EOD range located at the intersection of Riverview and Symmes Roads. Army EOD operations ceased in 1990 and the range underwent closure under the Resource Conservation and Recovery Act regulations. WPAFB records indicate that between 1996 and 2004, emergency permits were obtained from the Ohio Environmental Protection Agency (OEPA) for emergency ordnance detonations conducted by the 731st Army EOD. The permitted detonations occurred at either the Prime BEEF Training Area or the Fireworks pit located in Area B.

With the arrival of a new Air Force EOD flight (88 ABW/CED) to WPAFB in October of 2007, the requirement for an on-site proficiency training range has been mandated. The Air Force EOD Training Program aims to produce professional, highly qualified, technically proficient EOD teams capable of safely and efficiently performing peacetime and wartime EOD missions. EOD proficiency training enables EOD teams to achieve and maintain a level of competency to safely and effectively deal with explosive hazards. In accordance with Air Force Instruction (AFI) 32-3001, Air Force Materiel Command (AFMC) Supplement 1, *Explosive Ordnance Disposal Program*, 2 May 2006, all EOD personnel at flight level will participate in unit training.

Tetra Tech, Inc. (Tetra Tech) has subcontracted with CTI and Associates, Inc. (CTI) and Natural Resources Consulting, Inc. (NRC) to provide specialized services to perform an environmental assessment (EA) to identify and evaluate the environmental impacts surrounding this action at four proposed locations (Figure 1.1).

1.2 PROJECT DESCRIPTION

The USAF proposes to construct and operate an EOD proficiency training range designed for controlled detonation of ordnance not exceeding 5 lbs of demolition explosives at one of four (4) locations located within the property boundaries of WPAFB (Figure 1.1). The EOD range would be operated by 88 ABW/CED for the purpose of providing Air Force required proficiency training to EOD personnel.

At maximum operations, training would be conducted an average of 3 days/week, up to 8 hours per day. However, routine training would most likely occur once per week with one detonation per week. The 8 hours include set-up, training for the detonation of explosive materials, and the actual detonation event. The maximum number of detonations that would occur in an 8 hour training period is one per hour or a total of 8 detonations. Each actual detonation/explosion is instantaneous. Routinely, training would occur during a normal 8 hour work day, however infrequent training would occur during night-time hours.

Controlled detonations during training exercises are proposed to be conducted within the confines of a six foot tall, 46 feet long by 24 feet wide, pre-cast concrete barricade (Plate I) to be erected at the site. The structure will serve to control ejection of debris from the blast and control other potential impacts generated by the detonation of ordnance. In addition to the pre-cast barricade, two smaller barriers (approximately 6 feet long x 6 feet wide x 4 feet high) to contain tools and explosive materials, fencing, a flagpole, and a gravel access road and parking area would also be constructed. The two smaller barricades will require an explosives site plan and generate a 115 foot explosives clear zone. Ordnance used for training will be stored remotely in the designated munitions storage area on WPAFB and transported using military vehicles to the training area.

As required by Air Force Manual (AFMAN) 91-201, *Explosives Safety Standards*, 17 November 2008, the detonation site must be at least 500 feet (clear zone) from all above-ground facilities, including any buildings, structures, above-ground utilities, roadways, airfield runways and taxiways, and base boundaries. A fence posted with EOD warning signs would be installed around the 500' clear zone perimeter. In addition, the vegetation within 200' around the detonation point (combustible free zone) must be maintained free of all readily combustible material, such as standing trees, dry grass, leaves, brush or dead wood.

1.3 DECISION TO BE MADE

The purpose of this EA is to analyze the environmental impacts of the Proposed Action and its alternatives (including the No Action Alternative). Based on the evaluation in this EA, a determination would be made as to whether there are significant environmental impacts expected from the Proposed Action. The evaluation in this EA would result in a Finding of No Significant Impact and of No Practicable Alternative (FONSI/FONPA) if environmental impacts are not significant, or in the determination that an Environmental Impact Statement (EIS) must be prepared if environmental impacts

are potentially significant. This EA provides the decision maker and the public with information required to understand the short-term and long-term consequences of the Proposed Action and its alternatives.

1.4 SCOPE OF ENVIRONMENTAL ANALYSIS

The scope of work defined in the Statement of Work issued May 8, 2008 was developed in order to include relevant environmental considerations associated with potential impacts arising from emissions, noise, waste generation and disruption of wildlife habitat reasonably expected from the construction and operation of an EOD proficiency training range.

As no EOD operations are currently conducted at WPAFB, on-site studies have not been conducted to assess actual impacts. Therefore, assessments of similar operations at other Department of Defense (DoD) installations were consulted to better define the scope and level of research necessitated by the proposed project. The most applicable evaluation identified resulted from the proposal to re-locate an existing EOD operation at the Naval Air Station located in Whidbey Island, WA. (July, 2000).

The Naval base study was used as a basis for pre-existing research on noise, emissions and waste generation issues resulting from a functioning EOD operation. As no baseline information was available from WPAFB, studies conducted by the Army Corps of Engineers at other military installations were used to approximate the potential impacts resulting from detonation of ordnance at WPAFB. Specifically, research summarized in “Explosive Residues Resulting from the Detonation of Common Military Munitions: 2002 – 2006” (February 2007) and “Estimates for Explosives Residues from the Detonation of Army Munitions” (September, 2003) were used to identify likely conditions resulting from EOD activities.

Similarly, information on detonation noise impacts was unavailable from WPAFB as no similar activities have been conducted at the site since 1990 and no previous site specific information was available. In lieu of site specific investigation and/or testing, the scope was designed to utilize other DoD publications to approximate actual noise impacts and resulting responses from nearby receptors.

1.5 SUMMARY OF KEY REGULATORY REQUIREMENTS

Regulatory considerations including permits and licenses required to complete this project are summarized in Table 1.5.

1.6 PUBLIC NOTIFICATION

During the data collection period of this EA, WPAFB sent correspondence (Appendix A) affording the following agencies an opportunity to provide comments regarding the proposed locations of the EOD Range: United States Fish and Wildlife Service (USFWS), Ohio Department of Natural Resources (ODNR), Miami Conservancy District, the State Historical Preservation Officer (SHPO) at the Ohio Historical Preservation Office (OHPO), City of Fairborn, National Park Service (NPS), The Nature Conservancy (TNC), the Advisory Council on Historic Preservation (ACHP), certain local Native American Indian Tribes, and the National Aviation Heritage Alliance (NAHA). Written comments were received from the agencies and other parties listed above in response to the request for consultation and are included in Appendix A.

A public notice was posted in both the Dayton Daily News and Skywrighter (WPAFB newspaper) on 10 April 2009. The Skywrighter also posted the public notice every Friday starting 10 April through 8 May 2009. The public comment period was held 10 April through 10 May 2009. See Appendix A for the public notice and mailing list. One comment was received from a resident of the City of Fairborn in response to the public notice. The resident expressed concern in a letter dated 21 April 2009 (Appendix A) regarding additional noise, local perception, and environmental concerns associated with location of the EOD range at the Sandhill location. WPAFB responded in acknowledgement of the expressed concerns in a letter dated 17 August 2009.

Table 1.5
Summary of Anticipated Regulatory Requirements

Issue	Governing Rule	Permit, Licence or Regulatory Action	Affected Site(s)
Air Quality	OAC 3745-31 - Permits to Install New Sources and Permit-to-Install and Operate Program	Potential to Emit Calculation	All Sites
Air Quality	OAC 3745-31 - Permits to Install New Sources and Permit-to-Install and Operate Program	Permit to Install not required (exempt as portable generators)	All Sites
Air Quality	OAC 3745-77 - Title V Permit Rules	No revision to Title V Permit required	All Sites
Soil Erosion	Local Sedimentation and Erosion Control Authority	Soil Erosion and Sedimentation Permits for clearing 200 foot zone	Sandhill and Former EOD Site
AICUZ Compatible Land Use / health and Safety	AICUZ Plan	Waiver to operate an EOD training and emergency Disposal facility in APZ1	Sandhill Site
Wetland Management	OAC 3745-1-54	Obtain Water Quality Control Certificate	Sandhill Site
Wetland Management	Part 404 CWA	Federal Wetlands Permit (to be determined)	Sandhill Site
Wetland Management	6111.021 ORC / OAC 3745-1-54	State Isolated Wetlands Permit (to be determined)	Sandhill Site
Wetland Management	AFI 32-7064	Environmental Impact Statement for wetlands potentially impacted by EOD operations	Sandhill Site
Surface Water	Permit 11000001*BD	Revise NPDES Permit to Include proposed EOD operation (to be determined)	All Sites
Surface Water	General Storm water permit OHC000003	Prepare site specific storm water pollution prevention plan to address disturbance of soils	All sites
Surface Water	General Storm water permit OHC000003 40 CFR 122 ORC section 6111.04	Obtain notice of coverage by submitting Notice of Intent (NOI) under the general storm water permit program prior to construction (small construction site waiver may apply at Skeel Ave and Hebble Creek sites). A Notice of Termination (NOT) is required at project completion	All Sites
Hazardous Materials	49 CFR Part 172	WPAFB staff transporting ordnance must be properly trained and obtain DOT Haz Mat Endorsement	Sandhill Site

Table 1.5
Summary of Anticipated Regulatory Requirements

Issue	Governing Rule	Permit, Licence or Regulatory Action	Affected Site(s)
Health and safety	29 CFR Part 1910	Evaluate emissions and noise for potential personal protective equipment requirements	All Sites
Health and safety	Air Force Instruction (AFI) 32-3001	All EOD personnel at flight level are required to participate in unit training	All Sites
Health and safety	Air Force Materiel Command (AFMCM) Supplement 1	All EOD personnel at flight level are required to participate in unit training	All Sites
Health and safety	Explosive Ordnance Disposal Program	All EOD personnel at flight level are required to participate in unit training	All Sites
IRP	Closure Approval dated May 3, 2000	Consult OEPA to determine if development of EOD site is consistent with authorized Industrial Use	Former EOD Site
IRP	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)	Clean-up of IRP sites as necessary	All Sites
IRP	Resource Conservation and Recovery Act (RCRA), 1980	Waste characterization of explosive residues and soils removed from EOD site. No permit required unless open burning is planned	Former EOD Site
Transportation	AFMAN 91-201	Instruction to be provided by staff of WPAFB for guidance of personnel transporting explosives in approved storage, packaging and shipping containers	All Sites
Closure Plan	OAC 3745-66-12	Ohio EPA Closure Certificate	Former EOD Site
Explosives Safety Standards	AFPD 91-2	To identify hazards and state safety precautions and rules when working with explosives	All Sites
Explosive Ordnance Disposal	AFPD 32-30	Directive to establish policies to provide the Air Force with a ready capability for mitigating and defeating hazards caused by domestic or foreign explosive ordnance (EO) or improvised explosive devices (IEDs) containing conventional explosive, nuclear, biological, chemical, radiological, or incendiary material	All Sites
Cultural Resources	National Historic Preservation Act of 1966, As amended (Public Law 89-665: 16 U.S.C. 470 et seq.)	To Establish a Program for the Preservation of Additional Historic Properties throughout the Nation, and for Other Purposes	All Sites

Table 1.5
Summary of Anticipated Regulatory Requirements

Issue	Governing Rule	Permit, Licence or Regulatory Action	Affected Site(s)
Natural Resources	16 USC 670a-670o, 74 Stat. 1052, as amended, Public Law 86-797 (Sikes Act), DoD Directive 4700.4, DoD Instruction 4715.3, Air Force Policy Directive 32-70, and Air Force Instruction (AFI) 32-7064	Site Natural Resources Management Plan to be updated to include mitigation measures resulting from construction/operation of EOD range	All Sites

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This section describes existing conditions at the Proposed Action location as well as the three alternative locations considered in this EA.

2.2 PROCESS USED TO FORMULATE ALTERNATIVES

WPAFB identified four independent locations for evaluation as potential sites for this operation. The criteria used to determine the site locations is based on explosive safety requirements, EOD training requirements, and the necessity to have the EOD range located on WPAFB. The decision criteria are listed below:

- adherence to explosive safety and EOD training requirements
- proximity to other base and civilian activities
- accessibility to a secured area on WPAFB
- environmental suitability
- existing infrastructure
- land use compatibility

The locations (Figure 1.1) under consideration for EOD activities are all located in Area C and include: 1) the Skeel Avenue Site (Proposed Action); 2) the former EOD range; (alternative 1); 3) the Hebble Creek Road site; (alternative 2); and 4) the Sandhill location. (alternative 3).

2.3 ALTERNATIVES ELIMINATED FROM FURTHER STUDY

During the planning process, the following alternatives were considered but determined not feasible and were eliminated from further evaluation in this EA.

2.3.1 Dayton Bomb Squad Range

Since the beddown of 88 ABW/CED in September 2007, the Dayton Bomb Squad has allowed WPAFB EOD personnel to temporarily train and conduct emergency detonations of ordnance at their range located on South Gettysburg Avenue in Dayton, Ohio. To utilize this facility, EOD personnel must transport

explosive materials across public roads and interstates for a distance of 20 miles, and a drive time of approximately 30 minutes one way (Figure 2.3.1).

Dayton Police Officers perform Bomb Squad missions as an additional duty to his/her primary job in another law enforcement field. The Dayton Police Department is expected to lose 48 police officers in January, 2011 as part of the state's Deferred Retirement Option Program. Although yet un-quantified, the reduction in department staff is expected to have an impact on the ability of the Dayton Police Department to satisfy the EOD needs of WPAFB.

While, to date, Dayton has accommodated WPAFB with each request to schedule range time this is not a reliable or preferred long-term option based on the transportation, safety and staffing factors outlined above. A permanent proficiency/training range is mandatory on WPAFB, in accordance with Air Force Instruction (AFI) 32-3001, *Explosive Ordnance Disposal Program*, 10 October 2007. This will provide a 24/7 facility to conduct mission critical training.

The following is a list of pros and cons concerning the continued use of the Dayton Bomb Squad Range.

Pros

- WPAFB EOD personnel interact and train with Dayton Bomb Squad personnel frequently.
- Limited maintenance is required by WPAFB since it is not owned by the Air Force.
- It is a gated and locked facility.

Cons

- The facility is not controlled by WPAFB EOD personnel.
- The facility must be scheduled in advance around the schedule of Dayton Police Dept/Bomb Squad personnel.
- The area does not provide cover to conduct undisturbed classified training.
- The area is unavailable for night training operations.
- The distance traveled across the county increases fuel and mileage expenses to the Air Force.
- Time spent away from the EOD shop increases response time to emergencies both on / off WPAFB.
- Travel limits spontaneous training opportunity for all assigned EOD personnel.
- Operations require transportation of regulated explosives on public roads.
- The facility does not satisfy the requirement established in AFI 32-3001 and AFMAN 91-201.
- Area is not owned by Air Force which limits improvements to facility, ie. barricade, explosive storage area.

2.3.2 Off-base Department of Defense Range

A second alternative would consider using an off-base already established Department of Defense EOD Range. The closest EOD range is located at Fort Knox, Kentucky, which is a 3 hour, 205 mile drive over public roads and interstates. This alternative is not viable for all the same transportation and safety reasons as listed above for the Dayton Bomb Squad Range.

2.3.3 Landfill 11 Site, Area C

Landfill 11 Site, Area C: The EOD range would be located on top of Landfill 11 which is located north of Riverview Road. This location was removed from consideration due to impact to landfill cover which would require expensive engineering and construction measures to mitigate. Past surveys have documented methane gas emissions coming from the landfill, and the 500 ft EOD clear zone overlaps the Mad River.

2.3.4 Area B Runway

This site is located in Area B behind the National Museum of the USAF in close proximity to the museum and public housing. In addition to the close proximity to the museum and public housing, this location was removed from consideration because operations would also impact the Air Force Research Laboratory laser test range and would be in an area open to public view and where public activities occur such as the TATOO and WW I and II aircraft fly-ins. In addition to the above considerations, transportation of munitions would be conducted across public roadways from Area C to Area B.

2.3.5 Prairie Trace Driving Range, Area C

The Prairie Trace Driving Range is located north of Skeel Avenue. This location was removed from consideration because if the EOD range was located at this site, the Prairie Trace Driving Range must be re-located. In addition, this site is located approximately 1600 ft from the Brick Quarters, and the perimeter of the 500 ft EOD clear zone is in close proximity to both the fitness jogging trail and Skeel Ave.

2.3.6 Taxi-Way Site, Area C

This eliminated location is located east of the HazCargo Pads south of Runway 23L/05R. This location was removed from consideration because locating the site at this location would result in the EOD operation being in both the primary surface area of Runway 23L/05R and in close proximity to the

parking spot of a Priority 1 resource. Significant impacts would result to daily airfield operations in that foreign object disposal (FOD) sweeps of the runway would be required after each detonation.

2.4 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES CONSIDERED

The four (4) proposed project locations selected by WPAFB as potential locations for development of the EOD range are described below and shown in Figure 1.1. Photographs of each proposed project location are provided in Plates II – X.

2.4.1 Skeel Avenue Site (Proposed Action)

The Skeel Avenue Site (Figure 1.1) is located in an undeveloped, generally flat field bordered to the south by the Huffman Prairie (a tallgrass prairie registered as an Ohio Natural Landmark), to the east by Skeel Avenue, and to the north and west by the WPAFB airfield.

Development of an EOD training range at the site would include construction of a concrete barricade and support structures as described in Section 1.2 and Plate I of this document. The project site is located within the 100 year floodplain as determined by the USACE. Access to the site will be off of Skeel Road, using the pre-existing gate located southeast of the airfield. A gravel entrance and parking area will be constructed, as well as a section of new fencing which will be added to the pre-existing fence, which runs along the east and north sides of the area to allow for complete encirclement of the proposed training area.

2.4.2 Former EOD Site (Alternative 1)

The first alternative location for establishment of a site for EOD training range at WPAFB is the former EOD site located in the southwest end of Area C (Figure 1.1). The location is bordered by Riverview Road to the south, and woodlands and wetlands to the north, east and west. The site is located approximately 335 feet east-southeast from the Mad River, and portions of the site are within the 10 and 100 year flood plains as determined by the US Army Corps of Engineers (USACE).

This location was previously used for open detonation activities from approximately 1950 until 1990. In addition to open detonation of ordnance, thermal treatment was conducted in a furnace constructed at the site. The EOD Range was operated from 1989 through the end of operations in 1990 as an Interim Status TSDF facility under the provision of 40 CFR Part 265. The site was remediated and granted closure by the OEPA with restrictions in May, 2000. Since remediation and closure, the site has been inactive and has returned to a natural state. Currently the site is heavily wooded and no structured activity is

conducted on the property. A fence surrounds the 5 acre area with a locked gate prohibiting unauthorized access. Development of an EOD training range at the site would include construction of a detonation blast structure and support structures as described in Section 1.2 and Plate I of this document.

2.4.3 Hebble Creek Road Site (Alternative 2)

This alternative (Figure 1.1) is an undeveloped, generally flat field bordered to the east by the Huffman Prairie Flying Field, (a National Historic Landmark operated by the National Park Service as a unit of the Dayton Aviation Heritage National Historical Park), to the south by Hebble Creek Road, to the west by a woodlot and to the north by Marl Road.

Development of an EOD training range at the site would include construction of a detonation blast structure and support structures as described in Section 1.2 and Plate I of this document. The project site is located within the 100 year floodplain as determined by the USACE. A gravel entrance and parking area will be constructed, as well as a new fence and access gate to provide access control to the proposed training area.

2.4.4 Sandhill Location (Alternative 3)

The Sandhill Location alternative is situated at the extreme north edge of WPAFB (Figure 1.1). The property is generally undeveloped and currently used for ancillary activities by the base, and for agricultural activities through a use agreement.

Development of the Sandhill Location as an EOD training range would entail construction of a detonation structure equivalent to that described in Section 1.2 and Plate I of this document on an elevated portion of agricultural property at the north end of WPAFB. The current access route to the site is from the west off of Haddix Road. An access road would be constructed providing ingress/egress to the EOD range from State Route 235 (Chambersburg Road). A gravel entrance and parking area will be constructed, as well as a new fence and gate to control access to the proposed training area.

2.4.5 No Action Alternative

As required by the National Environmental Policy Act (NEPA), this EA includes an assessment of the “No Action” Alternative. Under such an alternative, no EOD training range would be established at WPAFB. Under this alternative, the 88 ABW/CED would not be able to perform the Air Force required proficiency training. If the EOD range is not sited at WPAFB, the 88 ABW/CED mission would not be accomplished. The Dayton Bomb Squad Range does not meet Air Force requirements for an EOD

proficiency training range. Travel costs would be prohibitive for EOD personnel to travel to other locations to conduct routine proficiency training, as the nearest DoD range is located at Fort Knox, Kentucky, a 3 hour, 205 mile drive. A decision would have to be made as to whether or not the 88 ABW/CED would remain at WPAFB.

The No Action Alternative would result in: 1) lack of ability to meet readiness requirements for the 88 ABW/CED personnel; 2) continued hazards posed by transport of regulated explosives via public roadways; and 3) failure to comply with AFI 32-3001 and AFMAN 91-201.

2.5 COMPARISON MATRIX OF ALTERNATIVES

Each alternative considered in this assessment has been compiled in Table 2.5 with the comparison based on relative potential impacts posed by conducting the proposed EOD activities. The relative impact has been assigned as high, medium or low with high denoting a greater potential impact for the proposed alternatives, medium representing an average potential impact and low denoting a minimal level of impact from the proposed activities. Each environmental consideration was ranked to help the reader evaluate overall potential impact of each un-mitigated location as well as the impacts at each site with mitigative measures in place.

Table 2.5
Comparison of Matrix Alternatives

		Potential For Impact			
Affected Resource	Section #(s)	Skeel Avenue Site	Former EOD Site	Hebble Creek Road Site	Sandhill Site
		Preferred Location	Alternative #1	Alternative #2	Alternative #3
Natural Resources					
<i>Vegetation</i>	3.2.1 / 4.2.1	Low	Low	Low	Low
<i>Wildlife</i>	3.2.2 / 4.2.2	Low	Low	Low	Low
<i>Threatened/Endangered Species</i>	3.2.3 / 4.2.3	Low	Low	Low	Low
<i>Wetlands</i>	3.2.4 / 4.2.4	N/A	Low	N/A	Low
Water Resources					
<i>Groundwater</i>	3.3.1 / 4.3.1	Low	Low	Low	Low
<i>Surface Water</i>	3.3.2 / 4.3.2	Low	Low	Low	Low
<i>Floodplain</i>	3.3.3 / 4.3.3	Low	Low	Low	N/A
Hazardous Materials/Waste					
<i>IRP Sites</i>	3.4.1 / 4.4.1	Low	Low	Low	Low
<i>Hazardous Materials/Waste</i>	3.4.2 / 4.4.2	Low	Low	Low	Low
<i>Stored Fuels</i>	3.4.3 / 4.4.3	Low	Low	Low	Low
Land Use	3.5 / 4.5	Low	Low	Low	Moderate
Soils	3.6 / 4.6	Low	Low	Low	Low
Cultural Resources	3.7 / 4.7	Low	Low	Low	Low
Air Quality	3.8 / 4.8	Low	Low	Low	Low
Noise	3.9 / 4.9	Low	Low	Low	Moderate
Health and Safety	3.10 / 4.10	Low	Low	Low	Moderate
Socioeconomics	3.11 / 4.11	Low	Low	Low	Moderate
Transportation	3.12 / 4.12	Low	Low	Low	Moderate
Utilities	3.13 / 4.13	Low	Low	Low	Low
Environmental Justice	3.14 / 4.14	Low	Low	Low	Moderate

Impact Rating Description

Low: No Significant Impact Expected
Moderate: Moderate Impact Possible
High: Significant Impact Likely

3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This section reviews the existing environment at each of the alternative project locations for the proposed EOD facility and provides the baseline for assessment of the potential environmental impacts of each alternative in Section 4.0. Environmental conditions discussed in this section include Natural Resources, Water Resources, Hazardous Materials and Wastes, Stored Fuels, the Installation Restoration Program, Land Uses, Soils, Cultural Resources, Air Quality, Noise, Health and Safety, Socioeconomics, Transportation, Utilities, and Environmental Justice.

3.2 NATURAL RESOURCES

3.2.1 Vegetation

Most of the vegetation on WPAFB or in the vicinity of the base has been previously altered or modified to some extent by human disturbances (BHE 1999). Natural vegetative communities currently found at WPAFB include broadleaf forests (740 acres), wetlands (20.5 acres), prairie (109 acres), and old fields (306 acres) (WPAFB 2007). About one-half (48 percent or 362 acres) of the forest types at WPAFB can be classified as riverine or floodplain forest types that occur primarily within the floodplain of the Mad River or along riparian corridors associated with Hebble Creek and Trout Creek.

Native grassland vegetation at WPAFB occurs east of the Hebble Creek Road Site and includes the eastern portions of the Huffman Prairie Flying Field and the Huffman Prairie Ohio Natural Landmark. Considered to be one of the largest remnant black soil tallgrass prairies in Ohio, Huffman Prairie was designated as a State Natural Landmark in 1986 and has been actively managed by WPAFB since 1990 (WPAFB 2007). At least 23 species of prairie indicator plants are found in or near Huffman Prairie, to include dominant grasses such as Indian grass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), and little bluestem (*Schizachyrium scoparium*). Originally drained and farmed in the 1880's, Huffman Prairie was later used for pasture or was seasonally mowed until 1984. Portions of the vegetation in Huffman Prairie are severely degraded due to a high proportion of non-native plants and altered drainage patterns. Under a management plan recently developed for the Huffman Prairie, WPAFB has initiated measures to restore the degraded areas, to include control of invasive plant species and re-introduction of a prescribed fire rotation to help maintain the native prairie vegetation (AMEC 2007).

Grounds should be managed with limited maintenance to that which is necessary to prevent erosion and the waste of other natural resources. The level of vegetation control should be balanced with operational factors, such as cost to control, security, erosion prevention and passive defense (camouflage). The project area for each alternative includes grounds to be occupied by the EOD barricade and two temporary staging barriers (EOD facility) plus a 200 foot combustible free zone that would be managed around each site for fire safety purposes.

3.2.1.1 Proposed Action: Skeel Avenue Site

Based on field observations, the vegetation within the project area (200 foot combustible free zone plus barricade/detonation point) is primarily warm-season grassland associated with the Huffman Prairie. A small area (about 1.8 acres) of the northern part of the 500 foot clear zone also occurs outside the boundary of the Huffman Prairie between the edge of the native grassland vegetation and the active airfield (see Figure 3.2.1-d.1). In addition to the 200 foot combustible free zone and EOD facility location, the 500 foot clear zone is considered to be within the project area for this alternative for purposes of evaluating the potential environmental impacts of vegetation management on the Huffman Prairie.

The project area is located entirely within Burn Unit 1 in the northern portion of the Huffman Prairie (see Figure 3.2.1.1). The portion of the project area that includes the 200 foot combustible free zone and the EOD facility is 2.879 acres in size and occurs within Vegetation Zone U. The southern half (about 46 percent or 1.314 acres) of the combustible free zone falls inside the Huffman Prairie State Natural Landmark boundary. Field observations indicate that the vegetation inside the southern half of the combustible free zone is dominated by native warm season grasses such as big bluestem and Indian grass. The cover of the native grasses varies from about 30 to 75 percent, with a canopy height of about 1.5 to 2.0 meters tall. The northern part of the combustible free zone (1.565 acres) falls inside an area of restored prairie habitat dominated by a relatively dense cover (50 to 75 percent) of smooth brome and Canada goldenrod, with invasive plants such as common teasel, sweet clover (*Melilotus spp.*) and woolly mullen (*Verbascum thapsus*). Widely scattered clumps of native grasses (big bluestem and Indiangrass) are also present. The canopy height within the area of restored prairie is generally lower (about 0.5 to 1.0 meters) than inside the Ohio Natural Landmark boundary. The proposed EOD facility is located just north of the Ohio Natural Landmark boundary inside the restored prairie habitat.

The portion of the project area that includes the 500 foot clear zone is 18.015 acres in size. About 90 percent (16.163 acres) of the clear zone falls within the Huffman Prairie, with 7.507 acres inside the

Huffman Prairie Ohio Natural Landmark boundary and 8.656 acres inside restored prairie habitat (see Figure 3.2.1.1). The remaining 1.852 acres of the northern part of the clear zone is located outside of the tallgrass prairie habitat in an area of regularly mowed, cool-season grassland vegetation. The portion of the clear zone inside Huffman Prairie occurs entirely within Burn Unit 1 and encompasses portions of vegetation zones U, Z, and V. Based on field observations, the composition and structure of the prairie vegetation within these portions of the 500 foot clear zone are generally similar to those described for the 200 foot combustible free zone. The observed dominance of native grasses typically increases in the less weedy, southern portions of the clear zone. Due to the time of year of the observations (March 2009), it was not possible to accurately assess the cover of native prairie forbs. However, other field survey data (AMEC 2007) confirm that smooth brome and goldenrods (*Solidago* spp.) are the dominant species within monitoring plots located in the northern portions of vegetation zones U, Z and V, with a widely variable cover (10 to 30 percent) of big bluestem and lesser amounts of non-native plants such as common teasel, wild parsnip (*Pastinaca sativa*), white sweet clover (*Melilotus alba*), and Queen Anne's lace (*Daucus carota*).

3.2.1.2 Alternative 1: Former EOD Site

Based on field observations, the vegetation within the project area (200 foot combustible free zone plus barricade/detonation point) is currently a mosaic of old field and disturbed floodplain forest habitats west of Riverview Road. A small area of managed (regularly mowed) grassy vegetation also occurs in the eastern part of the 200 foot combustible free zone east of Riverview Road.

The old field community is moderately diverse, but dominated by weedy and disturbance-tolerant species such as Canada goldenrod (*Solidago canadensis*), Queen-Anne's lace (*Daucus carota*), Kentucky blue grass (*Poa pratensis*), tall boneset (*Eupatorium altissimum*), narrowleaf plantain (*Plantago lanceolata*), and teasel (*Dipsacus sylvestris*). A scattered cover (about 10-15 percent) of small (3-6 inches diameter) sycamore (*Plantanus occidentalis*), eastern cottonwood (*Populus deltoides*), and box elder (*Acer negundo*) is also present along with several large (reproductive) invasive bush honeysuckle (*Lonicera maackii*) and autumn olive (*Elaeagnus umbellata*) shrubs.

The floodplain forest community is located in the extreme western part of the proposed 200 foot combustible free zone on a terrace about five feet lower than the old field community. It is dominated by an immature, closed canopy of eastern cottonwood, sycamore, box elder, and silver maple trees (*Acer saccharinum*). Most of the trees are in the range of 6 to 10 inches in diameter, with a few cottonwoods up

to about 14 inches in diameter. There is a scattered to moderate cover (about 25-30 percent) of invasive bush honeysuckle and privet (*Ligustrum vulgare*) shrubs.

The herbaceous layer is relatively species-poor compared to the old field community, with significant areas of bare soil and only patchy cover of wood nettle (*Laportea canadensis*), false nettle (*Boehmeria cylindrica*), white snakeroot (*Eupatorium rugosum*), Virginia creeper (*Parthenocissus quinquefolia*), wingstem (*Verbesina alternifolia*), and green-headed coneflower (*Rudbeckia laciniata*). The invasive herbaceous species garlic mustard (*Alliaria petiolata*) and creeping Charlie (*Glechoma hederacea*) appear to be well-established throughout the floodplain of the Mad River. The overall species composition of this community type remains essentially unchanged outside the 200 foot combustible free zone and closer to the river. However, most of the overstory trees appear to be larger (12 to 20 inches in diameter) and the forest midstory and understory layers appear to be slightly more open (less invasive shrub cover) than the conditions observed in the project area.

3.2.1.3 Alternative 2: Hebble Creek Road Site

Based on field observations, the vegetation within the project area (200 foot combustible free zone plus barricade/detonation point) is currently old field habitat. The overall diversity of this grassland habitat is low and dominated by relatively few herbaceous species such as fescue (*Festuca sp.*), narrowleaf plantain, Kentucky bluegrass, and various foxtail grasses (*Setaria spp.*). Widely scattered Canada goldenrod occurs in a few locations. Tree species present in the general vicinity of the proposed location include silver maple, black cherry (*Prunus serotina*), and the non-native Siberian elm (*Ulmus pumila*). The typical tree growth pattern consists of open-grown crown architecture and multiple stems. The project area is part of a large, open field that is periodically mowed and contiguous with the Huffman Prairie Flying Field (located about 1000 feet east of the edge of the 200 foot combustible free zone).

3.2.1.4 Alternative 3: Sandhill Location

Based on field observations, the vegetation within the project area (200 foot combustible free zone plus barricade/detonation point) is a mosaic of upland and wetland habitats. A semi-open, shrubby upland occupies about 90 percent of the project area and a small palustrine emergent wetland (C24) occurs in the extreme southwestern part of the combustible free zone. The vegetative communities within the Sandhill Location area are generally of lower quality than other natural plant communities found on the base, as the landscape in the area has been frequently disturbed and intensively modified by past mining and landfill operations, as well as a tree removal project that occurred in 2002 and 2003 to manage the approach path (glideslope) of the airfield (WPAFB 2007).

Tree and shrub cover on the uplands is highly variable (ranging from about 25 to 50 percent) and dominated by species such as sycamore, green ash (*Fraxinus americana*), gray dogwood (*Cornus racemosa*), mulberry (*Morus alba*), honey locust (*Gleditsia triacanthos*), bush honeysuckle, and buckthorn (*Rhamnus cathartica*). Most of the trees are small (less than 4 to 6 inches diameter) and of poor form and stem quality. The herbaceous layer in the uplands is highly variable and appears to be a mix of native prairie and non-native or weedy herbaceous species common to disturbed grassland environments. Dominant herbaceous species include tall boneset, Queen Anne's lace, Canada goldenrod, hop clovers (*Melilotis* spp.), dogbane (*Apocynum* sp.), and chickory (*Cichorium intybus*). The occurrences of native prairie vegetation appear to be patchy and, where present, dominated by species such as big bluestem, dropseed grass (*Sporobolus asper*), compass plant, ironweed (*Vernonia* sp.) and black-eyed Susan (*Rudbeckia hirta*).

Vegetation within Wetland C24 is a mixture of shrub-scrub and herbaceous vegetation dominated by common reed (*Phragmites australis*), narrowleaf cattail (*Typha angustifolia*), fox sedge (*Carex vulpinoidea*), and Canada goldenrod, with scattered eastern cottonwood saplings, sandbar willow (*Salix exigua*), purple loosestrife, and white-root rush (*Juncus barchcarpus*) (BHE 2005). Additional details regarding the condition of this wetland are discussed in Section 3.2.4.

3.2.2 Wildlife

Previous base-wide surveys have identified 272 species of wildlife that are present at WPAFB at least on a seasonal basis: 23 mammals, 118 birds, 8 reptiles (3 snakes, 1 skink, and 4 turtles), 6 amphibians (4 frogs, a toad, and a salamander), 36 fishes, 14 mussels, 35 butterflies, 8 moths, 15 odonate (dragonflies and damselflies), 6 carrion beetles, and 3 crayfish (WPAFB 2007, BHE 1999). Common mammals on WPAFB include white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), beaver (*Castor canadensis*), groundhog (*Marmota monax*), eastern fox squirrel (*Sciurus niger*), eastern gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), and deer mouse (*Peromyscus maniculata*). Common birds on WPAFB include European starling (*Sturnus vulgaris*), eastern meadowlark (*Sturnella magna*), barn swallow (*Hirundo rustica*), savannah sparrow (*Passerculus sandwichensis*), red-winged blackbird (*Agelaius phoeniceus*), Canada goose (*Branta canadensis*), red-tailed hawk (*Buteo jamaicensis*), horned lark (*Eremophila alpestris*), American robin (*Turdus migratorius*), turkey vulture (*Cathartes aura*), mourning dove (*Zenaida macroura*), killdeer (*Charadrius vociferus*), American crow (*Corvus brachyrhynchos*), and mallard (*Anas platyrhynchos*). Appendix B of the INRMP contains a detailed list of species encountered during the fauna surveys.

Specific fauna surveys have not been conducted for the proposed project areas. However, many of the common terrestrial mammal and bird species present at WPAFB often utilize more than one type of habitat (forest, old fields, prairie, or wetlands) and can be considered habitat generalists likely to be found at all four alternative sites. Most species of amphibians, reptiles, and dragonflies documented at WPAFB have been found in or near aquatic habitats. Habitat specialists that are federal or state-listed wildlife species and known to occur at WPAFB are discussed in Section 3.3.3. In addition, a large number of species endemic to prairie communities are known to occur in the Huffman Prairie. Surveys for Lepidoptera at Huffman Prairie have identified 23 species of butterflies and over 100 moth species (WPAFB 2007). Twenty-eight species of these moths were new records for the State of Ohio and appear to be either prairie specialists or species at the edges of their known ranges (Metzler and Zebold 1995).

The project area for each alternative includes grounds to be occupied by the EOD barricade and two temporary staging barriers (EOD facility) plus a 200 foot combustible free zone that would be managed around each site for fire safety purposes. In addition, the 500 foot clear zone is evaluated for the Proposed Action (Skeel Avenue Site) for purposes of assessing the potential environmental impacts of vegetation management on the Huffman Prairie. Projected noise contours for each alternative are also included in the analysis of wildlife habitats for each alternative.

3.2.2.1 Proposed Action: Skeel Avenue Site

Wildlife habitats present in the project area include approximately 16.163 acres of upland habitat tallgrass prairie habitat. The overall quality of this habitat for wildlife is considered high, based on field observations, the unique character of the prairie in relation to other vegetation types present at WPAFB and within the region, and the known presence of at least one state-endangered species (the blazing star stem borer). Although the edges and northern portions of the Huffman Prairie have been degraded by invasive plant species, the overall structure of the prairie vegetation provides valuable habitat for nesting grassland birds. While the observed habitat quality is generally higher within the Huffman Prairie Natural Landmark boundary (where a higher percent cover of native warm-season grasses is present), the restored portions of the prairie in the northern parts of the project area also help buffer the rest of the core wildlife habitat against detrimental edge effects such as predation of songbird nests by small mammals. In addition, the Huffman Prairie contains a highly diverse assemblage of prairie-obligate Lepidoptera species.

3.2.2.2 Alternative 1: Former EOD Site

Wildlife habitats present in the project area include approximately 2.281 acres of old field associated with the former EOD range and less than 0.1 acres of floodplain forest. Approximately 0.308 acres of

managed, open field habitat associated with the active airfield is also present east of Riverview Road. Based on field observations, the overall quality of this habitat for wildlife is considered low to moderate. The floodplain forest habitat within the combustible free zone is comprised mainly of trees less than 10 inches in diameter, with no large snags, den trees, or large coarse woody debris on the forest floor. Invasive and weedy plants (woody shrubs and herbaceous species) are present throughout the old field and floodplain forest habitat. In addition, both habitats are subject to a high amount of edge effects from adjacent roads and developed grounds on WPAFB.

3.2.2.3 Alternative 2: Hebble Creek Road Site

Wildlife habitat in the project area includes approximately 2.879 acres of periodically mowed, old field habitat. Based on field observations, the overall quality of this habitat for wildlife is considered low. Although located in the center of a large, open field, the habitat quality at this alternative site is limited by the general lack of structural diversity, dense herbaceous cover, and dominance of the vegetation by non-native grasses and herbaceous species.

3.2.2.4 Alternative 3: Sandhill Location

Wildlife habitats present in the project area include approximately 2.673 acres of upland habitat and 0.208 acres of wetland habitat. Based on field observations, the overall quality of this habitat for wildlife is considered moderate. The mixture of shrubby upland, shrub-scrub wetland, and wet meadow/emergent wetland communities present in the project area provide a high degree of structural complexity as well as spatial diversity in habitat types for wildlife. However, the overall productivity of these habitats is limited by the poor soils (see Section 3.6) and recurrent disturbances to vegetation (see Section 3.2.1) in the Sandhill Location. Invasive plant species such as narrowleaf cattail (*Typha angustifolia*) and common reed (*Phragmites australis*) are also locally dominant in Wetland C24 and many of the neighboring wetlands.

3.2.3 Threatened and Endangered Species

Air Force regulations (AFPD 32-70 and AFI 32-7064) require all USAF properties to protect species classified as endangered or threatened under the Endangered Species Act of 1973 (ESA) and to comply with state regulations for species classified as threatened and endangered (e.g., State of Ohio Law 1531.25). Air Force Instruction 32-7064 also states that USAF installations sustaining federally listed species or their habitats must address conservation of federally listed species in the INRMP. The INRMP also includes species that are proposed or candidates for federal listing. Additionally, AFI 32-7064 states

the INRMP will provide for the protection and conservation of state listed species when practicable and not in conflict with the military mission.

A number of federal and state-listed species have been documented at WPAFB by various surveys conducted for rare species of plants and wildlife (See Table 3.2.3). Federally listed or protected species present on WPAFB are the Indiana bat (*Myotis sodalis*), the clubshell mussel (*Pleurobema clava*, a mussel), and the bald eagle (*Haliaeetus leucocephalus*). The bald eagle was recently removed from the federal list of threatened and endangered species but is still protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The eastern massasauga rattlesnake (*Sistrurus c. catenatus*), a candidate for federal listing, also occurs on WPAFB. An endangered species management plan (ESMP) has been developed in consultation with the U.S. Fish and Wildlife Service (USFWS) and Ohio Department of Natural Resources (ODNR) for federally listed, candidate, and protected species. The ESMP also addresses the blazing star stem borer (*Papaipema beeriana*), a state-listed moth also known as Beer's noctuid. In accordance with USAF guidance, the ESMP has been fully incorporated into the INRMP, which contains detailed life history, conservation information, and management strategies for each of these species (WPAFB 2007).

At present, Indiana bats are only known to occur on WPAFB during the summer maternity season (approximately 01 April through 30 September) when the species uses forest and wooded riparian habitats for foraging and potentially for roosting (WPAFB 2007). The base does not contain suitable Indiana bat winter habitat (i.e., hibernacula) and no critical habitat has been designated on WPAFB. Specific dates when the bats arrive at WPAFB in the spring and depart in the fall are not known. The nearest hibernaculum to WPAFB is the Lewisburg Limestone Mine in Preble County, Ohio approximately 20 miles west of the base.

In February 2009, a bald eagle nest was identified at the City of Dayton wellfield, located approximately 1 mile southwest of the nearest site under consideration in this EA. Consultation regarding the potential implications of the eagle nest was initiated with both the USFWS and the ODNR in e-mail correspondence dated July 16, 2009 and July 22, 2009 respectively (Appendix A).

Remains of clubshell mussels have been found along the Mad River during wildlife surveys of WPAFB and potential habitat for the clubshell exists throughout the sections of the Mad River on base (WPAFB 2007). Although this species may have been extirpated from the Mad River, WPAFB implements a management strategy to provide potential mussel habitat, to maintain or increase current population levels of freshwater mussels, and to protect them from adverse impacts resulting from the base mission.

The only known food plants of the blazing star stem borer species are “blazing stars” belonging to the genus *Liatris*. To date, Huffman Prairie is the only location where this species has been documented on WPAFB (and only one of three sites where it has been found in Ohio). However, because blazing star plants have been observed in several other fields on the base, the Air Force considers old field habitats on WPAFB to provide suitable habitat for this moth (WPAFB 2007).

Upland sandpipers are the only state-listed, species of concern, or species of interest known to currently utilize WPAFB for breeding habitat (BHE 1999). This species prefers flat, open terrain with short-grass habitats such as prairies, pastures, and grasslands. Upland sandpipers have been observed between runways and in managed (mowed) fields within the active airfield of Area C. Sedge wrens (breeding males) were previously observed on Huffman Prairie in 1992, but no subsequent occurrences of this species has been documented in the prairie. Other species such as the king rail, common tern, Henslow’s sparrow, osprey, sharp-shinned hawk, and peregrine falcon have been observed on the base only as occasional visitors or transitory migrants.

Two plants classified as potentially-threatened by the state of Ohio, royal catchfly (*Silene regia*) and tall larkspur (*Delphinium exaltum*), were planted in several locations within the Huffman Prairie as part of past restoration efforts (BHE 1999). Although both species are endemic to tallgrass prairie habitats, it is not possible to determine the origin of the planted seed and therefore these populations are considered to be introduced at WPAFB for management purposes (WPAFB 2007). It is possible that both species may be horticultural cultivars instead of genotypes of the state-listed species. The greatest concentrations of the royal catchfly and tall larkspur have been observed in vegetation zone Y and the former prairie garden near the southern boundary of Huffman Prairie (AMEC 2007).

As part of the environmental assessment process, consultations have been initiated with the USFWS and the ODNR to evaluate potential impacts on threatened and endangered species. After review of the alternative project areas, the ODNR indicated that the following species could occur within a one-mile radius of the sites:

- at the Proposed Action (Skeel Avenue Site) – Sedge wren and Beer’s noctuid
- at Alternatives 1 and 2 (Former EOD and Hebble Creek Road sites) – Indiana bat, Beer’s noctid/blazing star stem borer, eastern massasauga rattlesnake, sedge wren (*Cistothorus platensis*), and lesser ladies’ tresses orchid (*Spiranthes ovalis*);

- at Alternative 3 (Sandhill Location) - Great plains ladies tresses (*Spiranthes magnicamporum*).

After a review of the alternative project areas, the USFWS indicated that the project areas are within the range for the following federally listed endangered species: Indiana bat and clubshell mussel. The USFWS also indicated that the project areas are within the range of the following federal candidate species or species of concern: eastern massasauga and snuffbox mussel (*Epioblasma triquetra*). Copies of correspondence from ODNR and USFWS are included in Appendix A and conclusions discussed in Section 4.2 of this EA.

3.2.3.1 Proposed Action: Skeel Avenue Site

The project area for this alternative (200 foot combustible free zone plus EOD facility) includes approximately 1.17 acres of suitable habitat for the blazing star stem borer (Figure 3.2.3-1c.1a). The 500 foot clear zone encompasses 7.066 acres of suitable habitat for the blazing star stem borer. Although no blazing star (*Liatris spicata*) plants were found in the immediate vicinity of the proposed EOD facility during a field reconnaissance on March 4, 2009, other native prairie plants observed in the surrounding tallgrass prairie environment suggest this habitat is highly suitable for the requisite host plant for the blazing star stem borer.

3.2.3.2 Alternative 1: Former EOD Site

No known habitat for threatened or endangered species occurs within the project area for this alternative (combustible free zone plus EOD facility). The forested habitat to the west, north, and south of the project area provides suitable habitat for the Indiana bat (Figure 3.2.3-2) and the bald eagle. Both habitats nearly or co-located with overlap each other within the western part of the 500 foot clear zone.

The projected noise contours for the project include suitable habitats for the Indiana bat, bald eagle, and clubshell mussel. A total of 269.69 acres of Indiana bat habitat fall within the projected noise contours; 65.94 acres are inside the 136 dB contour and 203.75 acres are inside the 129 dB contour (Figure 3.2.3.2a). Most of this habitat is located to the south and west of the proposed EOD facility location. A total of 257.02 acres of bald eagle habitat fall within the projected noise contours; 64.03 acres are inside the 136 dB contour and 192.99 acres are inside the 129 dB contour (Figure 3.2.3.2b). Most of the suitable habitat for the bald eagle is also to the south and west of the proposed EOD facility, where it often overlaps with suitable Indiana bat habitat. A total of 34.57 acres of clubshell mussel habitat fall within the projected noise contours; 9.70 acres are inside the 136 dB contour and 24.87 acres are inside the 129 dB contour (Figure 3.2.3-2a). All habitats suitable for the clubshell mussel are found within the banks of

the Mad River, which is about 635 feet to the west of the center of the proposed EOD facility. To date, the snuffbox mussel has not been documented at WPAFB, but if this species is present it likely occurs in the same habitat as the clubshell mussel.

3.2.3.3 Alternative 2: Hebble Creek Road Site

The project area for this alternative (200 foot combustible free zone plus EOD facility) includes approximately 2.88 acres of suitable habitat for the blazing star stem borer (Figure 3.2.3-.3a). No blazing star (*Liatris spicata*) host plants were observed within the project area during a field reconnaissance on September 4, 2008 and the clear zone appears to be dominated by a dense cover of non-native herbaceous species. Blazing star plants are known to occur in the Huffman Prairie, which is approximately 3400 feet to the east of the center of the proposed EOD facility.

3.2.3.4 Alternative 3: Sandhill Location

The project area for this alternative (200 foot combustible free zone plus EOD facility) includes approximately 1.49 acres of suitable habitat for the blazing star stem borer (Figure 3.2.3-.4a). No blazing star (*Liatris spicata*) host plants were found in the immediate vicinity of the proposed EOD facility during a field reconnaissance on September 4, 2008. However, other prairie plants observed in the surrounding upland environment (see Section 3.2.1) and the combustible free zone (with exception of wetland C24) should be considered suitable habitat for this species.

3.2.4 Wetlands

Waters of the United States, including jurisdictional wetlands, are protected by Sections 404 and 401 of the Clean Water Act (Title 33, United States Code Section 1344). The U.S. Army Corps of Engineers (USACE) and USEPA jointly administer Section 404 of the Clean Water Act. Actions that impact wetlands, to include dredging, filling, and any activities that discharge sediment or displace soil into a wetland may require a Section 404 permit from the USACE. A federal permit may not be required for activities that affect isolated wetlands in all circumstances because recent changes in regulatory guidance jointly issued by the USACE and USEPA now require application of a “significant nexus” test to determine if an isolated wetland provides biological, physical, or chemical benefits to a “traditionally navigable water” (TNW or navigable by large commercial vessels).

Wetlands that are determined by USACE to be isolated from other waters of the United States and not regulated under federal law are subject to state regulation under the Ohio Isolated Wetlands Law (Section

6111.021 of the Ohio Revised Code). Impacts to such isolated wetlands in Ohio are regulated by OEPA through the General Isolated Wetland Permit. In addition, through the Section 401 Water Quality program, the State of Ohio has implemented anti-degradation criteria for wetlands (Section 3745-1-54 of the Ohio Revised Code). These standards require that Section 401 applicants assess the functions and values of potentially affected wetlands using a numerically derived score developed through application of the Ohio Rapid Assessment Methodology (ORAM). The ORAM score classifies wetlands into three categories (Category 1, 2, and 3) that are afforded different levels of regulatory protection and require different levels of compensatory mitigation for unavoidable wetland impacts.

Executive Order (EO) 11990 (*Protection of Wetlands*) also requires Federal agencies to minimize any significant action that contributes to the loss or degradation of wetlands and that action be initiated to enhance their natural value. The Air Force has established policies to implement EO 11990 through its Environmental Quality and Natural Resources Programs (AFI 32-7064, dated 17 September 2004). As part of these policies, proposed actions that could impact wetlands, even if the affected area is not within a jurisdictional wetland boundary, must be evaluated through an environmental impact analysis in accordance with NEPA and the Air Force EIAP regulations found at 32 CFR Part 989. In addition, prior to any construction activity in a wetland area, proponents must first prepare a Finding of No Practicable Alternative (FONPA), which documents that there are no practicable alternatives to such construction, and that the proposed action includes all practicable measures to minimize harm to wetlands (Section 3.6, AFI 32-7064). In preparing the FONPA, the AF must consider the full range of practicable alternatives that will meet the proposed mission requirements.

3.2.4.1 Proposed Action: Skeel Avenue Site

No wetlands occur within or in close proximity to the project area (500 foot clear zone plus EOD facility) for this alternative (Figure 3.2.4-.1).

3.2.4.2 Alternative 1: Former EOD Site

No wetlands occur within the project area (200 foot combustible free zone plus EOD facility) for this alternative (Figure 3.2.4-.2). One wetland (C12) occurs within the 500 foot clear zone approximately 380 feet to the west of the proposed detonation point. Although relatively small (0.02 acres in size), this palustrine forested wetland occurs on the floodplain of the Mad River and is hydrologically connected to the riverine environment. It would therefore fall under the jurisdiction of the USACE as well as OEPA. This wetland has an ORAM score of 51.5, which is classified as a Category 2 wetland by OEPA (BHE

2005). Another small (0.06 acre), palustrine forested wetland, C13, also occurs on the Mad River floodplain about 800 feet to the southwest (downstream) of the proposed detonation point. Wetland C13 has an ORAM score of 56, also classified as a Category 2 wetland by OEPA (BHE 2005). This wetland is also classified as hydrologically connected to the Mad River.

3.2.4.3 Alternative 2: Hebble Creek Road Site

No wetlands occur within or in close proximity to the project area (500 foot clear zone plus EOD facility) for this alternative (see Figure 3.2.4-.3).

3.2.4.4 Alternative 3: Sandhill Location

One wetland (C24) occurs within the project area (200 foot combustible free zone plus EOD facility) for this alternative (Figure 3.2.4-.4). Wetland C24, a 2.35-acre palustrine emergent wetland, is located in the southwestern part of the project area. About 9 percent or 0.206 acres of this wetland fall within 200 feet of the detonation point. Topographically, this wetland is located downslope of the proposed EOD facility. Although hydrologically isolated, C24 receives surface flow from the southeast via a small intermittent channel that appears to be fed by a seep or spring (BHE 2005). Wetland C24 has an ORAM score of 47, which is classified as a Category 2 wetland by OEPA. While larger in size than other wetlands in the Sandhill Location area, the vegetation in C24 has been degraded by invasive species such as narrowleaf cattail and common reed.

Three other small, palustrine emergent wetlands are located within the 500 foot clear zone for this alternative: C4 (0.01 acre), C5 (0.03 acre) and C6 (0.54 acre). Wetland C4 and C6 are located approximately 330 feet to the north and northwest, respectively of the detonation point. Both of these wetlands are located topographically down gradient of northern portions of the combustible free zone. Wetland C5 is located about 440 feet to the north-northeast of the detonation point and occurs at approximately the same elevation or slightly higher than the closest portions of the combustible free zone. All of these wetlands are classified as modified category 2 wetlands by OEPA, based on ORAM scores of 38.5 (C4), 40 (C6), and 43 (C5) (BHE 2005). These isolated wetlands are likely not subject to federal regulation, but are regulated by the OEPA.

3.3 WATER RESOURCES

3.3.1 Groundwater

Areas A and C of WPAFB and the Mad River overlay a buried Pliestocene valley referred to as the Mad River buried valley. The valley was glacially carved into soft, calcareous shales and thin limestones of Ordovician age. These bedrock deposits bound the sides and bottom of the valley. The valley is narrow (from west to east) at the Huffman Dam, which is keyed into the Ordovician bedrock on both sides of the valley. Groundwater to the northeast of the dam (a) eventually flows below Huffman Dam through the narrow opening in the buried valley, (b) discharges to surface water and eventually into the Mad River, or (c) is captured by extraction wells. The underlying bedrock is primarily low permeable shale and does not constitute an aquifer (Dumouchelle et al., 1993).

Sediments within this valley consist primarily of sand and gravel outwash deposits with thin, laterally extensive clay layers. Groundwater generally occurs under unconfined water table conditions within the Mad River buried valley aquifer deposits. In areas where clay layers are present at the surface, confined or semi-confined conditions are present (IT Corporation, 1997).

Groundwater at the Base is defined as part of the Mad River Aquifer, which is part of the Miami Buried Valley Aquifer, a sole source aquifer. The Buried Valley Aquifer is a prolific source of water and is highly utilized as a municipal and industrial source. Groundwater extraction in the vicinity of WPAFB occurs at the City of Dayton's Huffman Dam wellfield and the Rohrer's Island wellfield; two City of Fairborn wellfields; the WPAFB Springfield Street, Skeel Road, and Water Road wellfields; Wright-State University; and the southwest boundary line of the groundwater removal action currently active on base (WPAFB, 1999).

The Buried Valley Aquifer within the area is a designated sole source aquifer under Section 1424(e) of the SDWA and the Ohio Administrative Code (OAC) Rule 3745-27-07(B)(5). The aquifer is generally confined to the buried valleys. Groundwater is recharged through infiltration of precipitation, groundwater flow into the area, and infiltration of surface water. Groundwater discharges from the area include groundwater flow out of the area; evapotranspiration from lakes, wetlands, and vegetated areas; groundwater extraction at numerous wellfields; and discharge into the Mad River (WPAFB, 1999).

3.3.1.1 Proposed Action: Skeel Avenue Site

The Skeel Avenue Site is located over the Mad River buried valley aquifer. The average ground surface elevation for the site is 804 feet MSL. The aquifer is likely unconfined at the site and occurs at an average elevation of approximately 799 ft MSL (IT Corporation, 1997). Near surface clays are present at the site with an approximate thickness of 5 feet (IT Corporation, 1997). The presence of this clay in the site area may cause semi-confining conditions. Groundwater flow at the site is to the southwest toward Huffman Dam (IT Corporation, 1997).

The nearest groundwater extraction in the vicinity of the site is the Skeel Avenue Wellfield which is located less than 1.0 mile from the proposed project site, and approximately 740' from the boundary of the 5 year time of travel aquifer recharge area for this wellfield. Extraction well EW-1 is located to the west along Riverview Road approximately 1.68 miles from this alternative location and the City of Dayton Huffman Dam wellfield is located approximately 2.3 miles from the site.

3.3.1.2 Alternative 1: Former EOD Site

The Former EOD site is located over the Mad River buried valley aquifer. The average ground surface elevation for the site is 790 feet MSL. While borings were not conducted during the scope of this assessment, the aquifer is likely unconfined at the site and occurs at an average elevation of approximately 785 feet MSL (IT Corporation, 1997). Near surface clays are present at the site with an approximate thickness of 5 feet (IT Corporation, 1997). The presence of this clay in the site area may cause semi-confining conditions. Groundwater flow at the site is to the southwest toward Huffman Dam (IT Corporation, 1997).

The nearest groundwater extraction in the vicinity of the Huffman Prairie Area occurs at extraction well EW-1 located to the west along Riverview Road. Water from EW-1 is treated and discharged on-site. The City of Dayton Huffman Dam wellfield and the Rohrer's Island wellfield are located approximately 1 and 1.5 miles, respectively, from the site.

3.3.1.3 Alternative 2: Hebble Creek Road Site

The Hebble Creek Road Site is located over the Mad River buried valley aquifer. The average ground surface elevation for the site is 795 feet MSL. The aquifer is likely unconfined at the site and occurs at an average elevation of approximately 790 feet MSL (IT Corporation, 1997). Near surface clays are present at the site with an approximate thickness of 5 feet (IT Corporation, 1997). The presence of this clay in the

site area may cause semi-confining conditions. Groundwater flow at the site is to the west toward Huffman Dam (IT Corporation, 1997).

The nearest groundwater extraction in the vicinity of the Huffman Prairie Area occurs at extraction well EW-1 located to the west along Riverview Road. Water from EW-1 is treated and discharged on-site through a National Pollutant Discharge Elimination System (NPDES) permitted outfall. The City of Dayton Huffman Dam wellfield and the Rohrer's Island wellfield are located approximately 1 and 1.5 miles, respectively, from the site.

3.3.1.4 Alternative 3: Sandhill Location

The Sandhill Area is located over the eastern edge of the Mad River buried valley aquifer. The average ground surface elevation for the site is approximately 873 feet above mean sea level (MSL). The aquifer is likely unconfined at the site and occurs at an approximate elevation of 820 ft MSL, indicating that the unsaturated zone at the site may be up to 60 feet in thickness. Bedrock elevations at nearby Operable Unit 7 range from 800 to 824 feet MSL (IT Corporation, 1997).

Comparison of elevations for the aquifer and the underlying bedrock suggests that the aquifer may be very thin in the Sandhill site area. The site was on the edge of the 1997 base-wide groundwater flow model area and the water table elevation was estimated (IT Corporation, 1997). Groundwater flow at the site, as indicated in the base-wide groundwater flow model, is to the west southwest toward the Mad River (IT Corporation, 1997).

The City of Dayton Huffman Dam wellfield and the Rohrer's Island wellfield are located approximately 5 and 5.5 miles, respectively, from the site. The site is located approximately 2.25 miles northeast of the WPAFB's Skeel Avenue wellfield located in Area C.

3.3.2 Surface Water

Surface water is a prevalent feature on and near WPAFB. As discussed in Section 3.2.4, numerous wetlands exist across the installation. In addition, the Mad River flows southwest along the western boundary of the base. Numerous tributaries (including Trout Creek and Hebble Creek) and drains direct storm water from the installation to the Mad River. The facility-wide Storm Water Pollution Prevention Plan (WPAFB, 2008) identifies areas of potential storm water impact in accordance with NPDES permit 11000001*CD.

Construction disturbing 1 acre or more of soil will require that the WPAFB obtain a certificate of coverage under the Ohio EPA General Storm Water permitting program (Table 1.5). As minimal grading and site preparation work would be required at the Skeel Avenue and/or Hebble Creek Road locations, a waiver for small construction sites may be available for these sites. For those sites requiring coverage under the general permit, a Notice of Intent must be submitted and approved by the Ohio EPA prior to construction (Table 1.5). Coverage under the general permit will require that a site specific storm water pollution prevention plan be prepared for the project or that the facility wide SWPPP be amended to include the project.

Contractors conducting construction activities will be required to prepare a project specific SWPPP for review and approval by the 88 ABW/CEANQ Storm Water Program Manager prior to beginning construction.

Addition of ongoing EOD operations at the base should be evaluated to determine whether they require inclusion in this plan. The following summarizes the known surface water conditions in the immediate vicinity of each of the four (4) proposed project locations:

3.3.2.1 Proposed Action: Skeel Avenue Site

This proposed location is relatively flat with an approximate elevation of 804 ft MSL across the 500 foot diameter clear zone surrounding the EOD structure (Figure 3.3.2.1). Trout Creek is located approximately 1,741' south-southeast of the proposed location and Hebble Creek is located approximately 1,600' east of the proposed EOD operation. Storm water is expected to travel via sheet flow and, should sufficient flow from rainfall be present, the storm water should flow west-southwest toward Trout Creek and eventually be discharged to the Mad River based on the NPDES Drainage Area Map (WPAFB, June, 2007).

3.3.2.2 Alternative 1: Former EOD Site

The former EOD Site is located at an approximate elevation of 795 feet MSL (Figure 3.3.2.2). The project area slopes to an elevation of approximately 790 feet MSL within the 500 foot clear zone around the proposed EOD structure. The proposed project site is located approximately 335 feet east-southeast of the Mad River. Based on ground surface contours in the area, storm water is expected to flow northwest via sheet flow towards the river. A small (0.02 acre) wetland area (C12) is located in the general direction of natural surface water flow and may receive some storm water run-off from the proposed project site.

3.3.2.3 Alternative 2: Hebble Creek Road Site

This proposed location is relatively flat with an approximate elevation of 797 feet MSL across the 500 foot diameter clear zone which would surround the EOD structure (Figure 3.3.2.3). Trout Creek is located approximately 1725' north-northwest of the proposed location and Hebble Creek is located approximately 329' south of the proposed EOD operation. Storm water is expected to travel via sheet flow and, should sufficient flow from rainfall be present, the storm water would enter the east – west ditch along Hebble Creek Road and eventually be discharged to the Mad River based on the NPDES Drainage Area Map (WPAFB, June, 2007).

3.3.2.4 Alternative 3: Sandhill Location

As described in Section 3.2.4.1 of this document, four wetlands (C4, C5, C6 and C24) occur within the project area (clear zone) for this alternative (Figure 3.3.2.4). Approximately 2.35 acres of wetland C24 falls within the 500 foot clear zone for the EOD operation. Approximately 0.206 acres of C-24 occurs within the 200' combustible free zone. Topographically, this wetland is located downslope of the proposed EOD facility and receives surface flow from the southeast via a small intermittent channel that appears to be fed by a seep or spring (BHE 2005).

Other small emergent wetlands are located within 500 feet of the detonation point, including C4 (0.01 acre) and C6 (0.54 acre) which are located down gradient of the proposed EOD location and C5 (0.03 acre) which occurs at approximately the same elevation as the proposed site. These wetlands are discussed in detail in Section 3.2.4.1. No other streams, rivers or tributaries occur within the immediate vicinity of the proposed site.

The approximate elevation of the project site is 873 feet MSL. The land slopes to the west south-west with an overall relief of approximately 20 feet over the 500 feet clear zone southwest of the proposed detonation point. Storm water is expected to travel by sheet flow toward the wetland C24.

3.3.3 Floodplain

WPAFB is located within the Mad River valley of the Great Miami River Basin. This valley is approximately 2 miles wide near the center of Area C and narrows to approximately 0.5 mile wide at the Huffman Dam, which is located just west of the WPAFB boundary in Area C. The Huffman Dam, constructed by the Miami Conservancy District (MCD) following massive flooding in 1913, serves as one of several flood retention basins to protect the Dayton metropolitan area from severe flood events. The

extent of the 100 year floodplain along the Mad River and within WPAFB is determined by water levels behind the dam and regulated by the MCD as the local federally-designated floodplain management agency. If necessary, the MCD has the authority to increase the pool level of the retention basin to 835.0 feet above mean sea level (MSL). Correspondence from MCD regarding the project alternatives is provided in Appendix A.

Most of Area C lies behind Huffman Dam and is subject to flooding. The 10-year floodplain elevation of the Mad River at WPAFB is 804.7 feet above mean sea level, while the 100-year floodplain, based on recent modeling studies conducted by the U.S. Army Corps of Engineers (USACE), is at an elevation of 814.3 feet above MSL. The Huffman Dam spillway is at an elevation of 835 feet above MSL, higher than most of Areas A and C and the base and portions of the city of Fairborn (ICI and SAIC 1995). The 200 year flood pool behind Huffman Dam is at an elevation of 817.6 feet (MCD 2008).

Elevations given below for each alternative are based on 1 foot contour data for WPAFB at the location proposed for the EOD facility (concrete barricade).

3.3.3.1 Proposed Action: Skeel Avenue Site

This site is located in an area of relatively flat to gently sloping topography at elevations of 802 to 807 feet MSL (see Figure 3.3.2-d).. The project area within the 200 foot combustible free zone is located at elevations of 803 to 805 feet, while the topography within the 500 foot clear zone ranges from 802 to 807 feet MSL. The EOD facility itself is located at elevations of 802 to 803 feet MSL. At these elevations, the EOD facility and almost all of the 200 foot combustible free zone are located within the 10 year floodplain and entirely within the 100 and 200 year floodplains for the retention basin. A small area of the eastern part of the 500 foot clear zone falls outside the 10 year floodplain, but within the 100 and 200 year floodplains for the retention basin.

3.3.3.2 Alternative 1: Former EOD Site

This site is located on a low terrace west of the Mad River at an elevation of 794 to 795 feet MSL. It is located entirely within both the 10-year and 100-year floodplains of the retention basin.

3.3.3.3 Alternative 2: Hebble Creek Road Site

This site is located in a relatively flat field at an elevation of approximately 797 feet MSL; slight undulations of +/- 1 foot occur at the proposed location of the concrete barricade. It is also located entirely within the 10 and 100 year floodplains for the retention basin.

3.3.3.4 Alternative 3: Sandhill Location Area

This site is located in an area of rolling topography at an elevation of 872 to 873 feet MSL. It is located outside both the 100 and 200 year floodplains for the retention basin.

3.4 HAZARDOUS MATERIALS/WASTE, STORED FUELS, AND INSTALLATION RESTORATION PROGRAM (IRP)

3.4.1 Installation Restoration Program (IRP)

The Installation Restoration Program (IRP) is designed to identify, assess and remediate sites of contamination on military installations. The IRP process provides a systematic approach for the DoD to fulfill its obligations at sites of environmental impact under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Resource Conservation and Recovery Act (RCRA). The IRP was developed in three phases beginning in approximately 1982. Through the identification assessment and remediation phases of the program, a total of 68 sites were identified in 11 operating units at WPAFB. To date, the majority of these sites have been satisfactorily remediated and are considered closed.

Although most sites are subject to CERCLA clean-up requirements, certain areas may be subject to closure under the requirements of RCRA. The types of sites requiring RCRA corrective actions are primarily hazardous waste treatment, storage, or disposal (TSD) facilities permitted under RCRA. Part of the RCRA permit conditions require corrective actions when a release of a hazardous waste occurs from a RCRA permitted TSD facility or when the TSD facility is being closed. The regulations specifying that corrective actions must be taken at these types of sites are found at Title 40 CFR Subpart S - *Corrective Action for Solid Waste Management Units*.

3.4.2 Proposed Action: Skeel Avenue Site

The Skeel Avenue Site is not currently included in the Installation IRP program, nor is it otherwise a known area of contamination. .

3.4.3 Alternative 1: Former EOD Site

The EOD Range is located in Area C, and has not been included in any OU. The site is regulated under State of Ohio RCRA regulations and has been included in this ROD because of the need to maintain institutional controls to limit access to the EOD Range. The facility was used for over 40 years to

thermally treat unserviceable munitions via detonation and burning. WPAFB submitted a RCRA Part A permit application in November 1988, followed by a RCRA Part B permit application in April 1989 for continued operation of the EOD Range.

The Part B permit application was subsequently withdrawn and the EOD Range operated under Interim Status until operations ceased in late 1990. Closure activities, completed in early 1998, consisted of removing ash and debris from the Open Burning (OB) unit, removing and recycling the OB unit, removing and disposing of approximately 10 cubic yards of nonhazardous contaminated soil from beneath the OB unit, and regrading the site. Land use is industrial and will remain so. The EOD was added to the 41 Site ROD to document land use control issues. The site was historically used as a site for open detonation activities until 1990. In addition to open detonation of ordnance, thermal treatment was conducted in a furnace constructed at the site. A Part B RCRA permit application was submitted to the EPA in 1989 and subsequently withdrawn. The EOD Range was operated from 1989 through the end of operations in 1990 as an Interim Status TSDF facility under the provision of 40 CFR Part 265.

A closure plan was submitted to the OEPA on April 30, 1997 with revisions submitted on May 30, 1997 and September 18, 1997. The plan was approved on December 10, 1997 and the WPAFB notified the OEPA of their intent to begin remediation and closure activities on October 17, 1997.

In October and November, 1997, the furnace, ancillary structures, soils and residue were removed from the area. The area was sampled to verify that remaining materials met criteria for closure. Soils remaining on the site included those which exceed background concentrations for several metals including lead, selenium and silver as well as detectable concentrations of certain Volatile and Semi-Volatile Organic Compounds (VOCs and SVOCs).

Soils left in-place were determined to meet the criteria for closure using an industrial exposure assumption and the OEPA accepted the closure certification provided that future activities at the site are restricted to industrial uses. Currently, a deed restriction is not in place which specifically defines acceptable activities in the closed, Former EOD area. The closure and requirement for deed restrictions, should a transfer of property ownership occur, were incorporated into the Record of Decision (ROD) signed on September 28, 1998.

3.4.4 Alternative 2: Hebble Creek Road Site

The Hebble Creek Road Site is not a known site of current impact and is not included in the IRP at WPAFB. Part of this site is located in the former Combat Arms Training and Maintenance (CATM)

range which was fully remediated under the IRP. The former CATM was in operation from approximately 1970 until 2004 when buildings on the site were demolished and metals contaminated soils resulting from historic arms training activities were remediated. The northeast portion of the 500' clear zone around the proposed EOD facility overlaps slightly with the historic boundary of the CATM area (WPAFB Explosive Site Plan). As the CATM site was satisfactorily remediated (Final Site Investigation Report, Combat Arms Training and Maintenance Facility, 2006) the historic impact in the area is not expected to affect conditions at the Hebble Creek Road site.

3.4.5 Alternative 3: Sandhill Location

The proposed location for the EOD operations at the Sandhill area is not a known site of impact. A historic landfill (LF9) does, however, exist in the general vicinity of the proposed EOD operations. The closed landfill is located approximately 950' southeast of the proposed EOD structure. Currently, the landfill is classified as a No Action Site (ROD Second 5 Year Update; WPAFB, 2005).

3.4.6 Hazardous Materials/Waste

Three (3) primary materials to be utilized for EOD training include the following: C4, TNT (trinitrotoluene), and thermite grenades. C4, which may be detonated alone or as a charge to detonate other munitions, is generally composed of 91% RDX (Cyclotrimethylenetrinitramine) and 9% oil & wax. TNT can be the sole constituent of some munitions including 155mm howitzers and some land mines. Grenades are generally composed of a body, filler, and fuse assembly. In the case of thermite grenades, the filler is a mixture called Thermate which combines thermite and pyrotechnic additives. Its composition by weight is typically 68.7% thermite, 29.0% barium nitrate, 2.0% sulfur and 0.3% of a binder.

The main explosive residues from C4, TNT, and grenades are RDX and TNT. The concentration of residue remaining after an explosion varies proportionally with the amount of the material used to create the explosive. In regards to hazardous waste, RDX and TNT residues are not considered regulated RCRA hazardous wastes. However, a limit of 2 ug/L has been established for RDX in drinking water.

USACE's Engineering Research and Development Center tested for residues of RDX and TNT. Hewitt, et al (2003) found that soil concentrations of RDX and TNT were low on a per round basis of detonation. For example, a 0.57 kg block of C4 leaves a RDX residue soil concentration of 10 ug/kg. A grenade containing 0.11 kg of RDX and 0.078 kg of TNT leaves concentrations of 0.085 ug/kg for RDX and non-

detectable levels of TNT in soil. Overall, higher levels of RDX are typically found as residue in soils due to the use of blocks of C4 as initiators (which are 91% RDX) for many blow-in-place detonations.

Similarly, studies documented in “Explosives Residues Resulting from the Detonation of Common Military Munitions: 2002-2006” evaluated residues of RDX, TNT, & HMX (cyclotetramethylene-tetranitramine). Walsh (2007) found that live fire and blow-in-place detonations will only leave milligram per kilogram quantities of explosive residues. However, the cumulative effect of detonating explosives in one area over time may lead to the accumulation of residues, specifically RDX, which is highly soluble in water and can result in groundwater contamination concerns.

Both studies found that live fire detonations (those initiated with a pre-set fuse) leave less residue than do blow-in-place detonations (which require either C4 or a blasting cap to initiate the explosion). Typically, live fire detonations result in high-order detonations in which a substantial proportion of the explosive material is consumed during detonation. Conversely, blow-in-place events tend to result in low order detonations in which a smaller proportion of explosives contained in the ordnance is consumed. Consequently, blow-in-place detonations tend to leave larger particles and a greater concentration of residue as less of the RDX and TNT is consumed during the explosion.

In “Assessment of Potential Environmental Health Risks of Residue of High-Explosive Munitions on Military Test Ranges – Comparison in a Humid and Arid Climate”, known munitions ranges were tested for levels of explosive residues, metals, and other contaminants. Philips and Perry (2002) provided results obtained from arid climate ranges as compared with those operated in a humid climate. In the arid climate RDX was detected in soil in 5 of 239 samples (2%). In the humid climate, HMX, RDX, and other explosive residues were detected in 13 of 90 soil samples (14%). Additionally, HMX and RDX were found in the groundwater and elevated levels of metals in the surface water, sediment, and soil at the humid site locations when compared to the background levels. The higher concentrations in the humid climate versus the arid climate locations may be attributable to water in the area providing a mechanism to transport and dissolve the residue. Regardless, there were no findings in which the levels of RDX / HMX or metals were high enough to cause adverse effects of human health or the environment.

The literature suggests that an EOD site operated in a climate such as that in Ohio is more prone to the potential for greater deposition of residue and higher potential, over time, for groundwater/surface water impact than ranges located in more arid climates. As such, diligent housekeeping and residue removal will be an important element of operating an EOD range at WPAFB.

Transportation of Hazardous Materials in as it relates to the proposed project is covered in Section 3.12 of this document.

3.4.6.1 Proposed Action: Skeel Avenue Site

The Skeel Avenue Site is currently undeveloped and exists as open space. No reported current or historic use of hazardous materials or generation of hazardous waste was identified at this location based on documents provided by WPAFB. Two (2) soils samples were collected during the site review on March 4, 2009. The samples are intended to represent background conditions at this location. Samples were collected in accordance with the Sampling Plan (Appendix B) prepared for this EA and approved by WPAFB. As required by the Statement of Work (SOW) for this EA, collected samples were analyzed by a qualified laboratory for metals. Results of sample analysis were reported with level 4 Quality Assurance/Quality Control documentation (Appendix C). A summary of the sample results is provided in the table below:

Table 3.4.6.1: Skeel Avenue Site Soil Sample Results

Parameter	SA-1 (mg/Kg)	SA-2 (mg/Kg)
Mercury	<0.125	<0.122
Silver	<1.08	<1.02
Aluminum	6340	6050
Arsenic	6.75	6.94
Barium	43.9	41.5
Beryllium	<0.542	<0.509
Calcium	1200	1280
Cadmium	<1.08	<1.02
Cobalt	7.69	7.57
Chromium	10.0	9.79
Copper	9.17	9.66
Iron	12400	12100
Potassium	395	365
Magnesium	1520	1440
Manganese	351	345
Sodium	<433	<407
Nickel	8.61	8.68
Lead	22.6	27.0
Antimony	<5.42	<5.09
Selenium	<5.42	<5.09
Thallium	<5.42	<5.09
Vanadium	22.0	21.4
Zinc	33.2	33.6

3.4.6.2 Alternative 1: Former EOD Site


The former EOD training site is located in the southwest end of Area C (Figure 1.1). The location is bordered by Riverview Road to the south, woodlands and wetlands to the north, east and west. The site is located approximately 335 feet east-southeast of the Mad River, and is within the 10 and 100 year flood plain as described in Section 3.3.3.1 of this document. This location was previously used for open detonation activities from approximately 1950 until 1990. In addition to open detonation of ordnance, thermal treatment was conducted in a furnace constructed at the site. Refer to Section 3.4.2 for discussion of operation, clean-up and closure history. As this site is known to be previously impacted, soil samples were not collected during the completion of this EA. Table 3.4.6.2, however, summarizes the maximum concentration of compounds detected at the time of closure at the former EOD range:

Table 3.4.6.2: Summary of Former EOD Site contaminants at Closure

Chemical	Max Value (mg/kg)	Estimated TCLP Value*	RCRA Limit (mg/L)
Inorganics			
Arsenic	1400	70	5
Barium	600	30	100
Cadmium	36	1.8	1
Chromium	22	1.1	5
Lead	290	14.5	5
Mercury	1.70	0.085	0.2
Selenium	0.25	0.0125	1
Silver	1.30	0.065	5
Volatile Organic Compounds			
Acetone	0.21	N/A	**
Ethylbenzene	0.0010	N/A	**
Toluene	0.0050	N/A	**
Total Petroleum Hydrocarbons	430	N/A	**
Xylenes	0.0130	N/A	**
Semi-Volatile Organic Compounds			
Bis(2-ethylhexyl)phthalate	1.7	N/A	**
Di-N-Butylphthalate	33	N/A	**
Flouranthene	2.3	N/A	**
Pyrene	2.4	N/A	**

* Based on estimate of TCLP data using Totals (mg/kg) data

** No Established RCRA Toxicity Criteria

 Total Results to be confirmed using TCLP

Currently, the site is heavily wooded and no structured activity is conducted on the property. A fence surrounds the 5 acre area with a locked gate prohibiting unauthorized access. Development of the property for renewed EOD activities would require clearing to remove all combustible materials within 200 feet of the point of detonation as required by EOD Publication 60A-1-1-9.

3.4.6.3 Alternative 2: Hebble Creek Road Site

This alternative is currently undeveloped and exists as open space. No reported current or historic use of hazardous materials or generation of hazardous waste was identified at this location based on documents provided by WPAFB. The clear zone for the proposed EOD operation does overlap with the previously remediated CATM area (Section 3.4.3). Soils historically impacted with metals have been removed from the CATM site.

Two (2) soils samples were collected during the site review on September 4, 2008. The samples are intended to represent background conditions at this location. Samples were collected in accordance with the Sampling Plan (Appendix B) prepared for this EA and approved by WPAFB. As required by the Statement of Work (SOW) for this EA, collected samples were analyzed by a qualified laboratory for metals. Results of sample analysis were reported with level 4 Quality Assurance/Quality Control documentation (Appendix C).

Table 3.4.6.3: Hebble Creek Road Site Soil Sample Results

Parameter	FF-1 (mg/Kg)	FF-2 (mg/Kg)
Mercury	<.014	<0.13
Silver	<1.53	<1.41
Aluminum	9830	10200
Arsenic	32.2	22.1
Barium	262	281
Beryllium	<0.767	0.878
Calcium	12400	17300
Cadmium	<1.53	<1.41
Cobalt	5.66	6.16
Chromium	12.7	12.7
Copper	26.2	19.3
Iron	24700	20000
Potassium	1370	1060
Magnesium	2190	3760
Manganese	394	370
Sodium	1070	1580
Nickel	15.3	14.5
Lead	38.3	26.4
Antimony	<7.67	<7.03
Selenium	<7.67	<7.03
Thallium	<7.67	<7.03
Vanadium	25	27.4
Zinc	64.7	53.2

3.4.6.4 Alternative 3: Sandhill Location

The Sandhill Location is generally undeveloped although some strip mining has occurred historically and a closed landfill (Landfill 9) is located approximately 950' south of the proposed EOD location. The closed landfill is regarded as a no-action site under the facility IRP. Visual observations during the site visit indicated some evidence of fill material placement in the general area of the proposed EOD site.

Similar to the Hebble Creek Road Site, two (2) soils samples were collected during the site review on September 5, 2008. The samples are intended to represent background conditions at this location. Results of sample analysis are summarized below and provided in their entirety in Appendix C of this EA.

Table 3.4.6.4: Sandhill Location Soil Sample Results

Parameter	SH-1 (mg/Kg)	SH-2 (mg/Kg)
Mercury	<0.14	<0.12
Silver	<1.20	<1.16
Aluminum	1380	5140
Arsenic	<1.20	2.55
Barium	116	105
Beryllium	<0.601	<0.579
Calcium	234000	164000
Cadmium	<1.20	<1.16
Cobalt	<1.20	1.85
Chromium	2.69	6.82
Copper	4.46	6.66
Iron	1350	5830
Potassium	708	1640
Magnesium	3260	6240
Manganese	63.1	107
Sodium	23000	16800
Nickel	1.46	4.58
Lead	<6.01	15.5
Antimony	<6.01	<5.79
Selenium	<6.01	<5.79
Thallium	<6.01	<5.79
Vanadium	1.59	8.08
Zinc	8.6	27.8

3.4.7 Stored Fuels

The proposed project does not include storage of fuels outside of minor amounts necessary for training activities. Any storage of fuels and /or ordnance will be transient and limited to the duration of individual training events. Similarly, none of the proposed alternative sites are currently used for fuel or other hazardous materials storage. No bulk fueling activities are planned within 100' of proposed EOD activities at any of the four proposed locations.

3.5 LAND USE

This section discusses the compatibility of the proposed alternatives with local land use plans, objectives and regulations for the Proposed Action and Alternative locations under review in this EA.

3.5.1 Proposed Action: Skeel Avenue Site

The Skeel Avenue alternative is bordered by the Huffman Prairie to the south, Skeel Avenue on the east and the airstrip to the north and west. Wright Patterson Golf Club and residential areas are located east of Skeel Ave. Pylon Road is also located west of the proposed site.

The property is generally flat and currently defined as open space. This location is partially fenced and an access gate located on Skeel Ave would be used to enter the site. An entrance and parking area would be required, as well as additional fencing required to completely encircle the 500' area around the EOD range.

3.5.2 Alternative 1: Former EOD Site

The former EOD site is located on Riverview Road at the intersection with Symmes Road (refer to Figure 1.1). The property is bordered by wooded vacant property to the north, east and west. The property is heavily vegetated with a concentration of mature trees along the east half of the property. A detailed discussion of site vegetation is provided in Section 3.2.1 of this document. The ground elevation at the proposed EOD site is approximately 795' MSL, sloping to approximately 790' MSL across the 500' clear zone.

The property was previously used as an EOD site until 1990 when it was de-commissioned and closed as described in Section 3.4.3 of this document. Since that time, the property has been essentially inactive. The closure authorization restricts land use on this property to industrial uses. No specific list of industrial uses is included in the closure approval dated 03 May, 2000 however, it appears likely that the intent of the restriction is to limit potential exposure to remaining contaminants.

The Land Use Control Plan (Shaw, 2006) lists the Former EOD Site as a grassy area in the flood zone and authorized land uses include "digging, construction and other soil disturbances allowable after approval by CE and Environmental Management Division personnel; area subject to use restrictions".

3.5.3 Alternative 2: Hebble Creek Road Site

The second alternative is located along Hebble Creek Road directly west of the Huffman Prairie Flying Field. The property is bordered by Marl Road to the east and northeast. A public use golf course is located approximately 0.7 mile south of the site. Hebble Creek is located approximately 329' south of the project location and Trout Creek is located approximately 1725' northwest of the proposed site.

The property is generally flat, with less than 1' fall in any direction within the 500' clear zone around the detonation structure. An above ground utility line bisects the property within the project area.

The site is accessible to the public via Hebble Creek Road during the hours of operation at the Huffman Prairie Flying Field. No existing fencing or other access control is in place at the property. A security fence, access road and access gate would be required prior to operation of the EOD facility at this location. The property use is currently defined as open space, occupied only by utility structures such as power poles and transmission lines.

3.5.4 Alternative 3: Sandhill Location

The Sandhill Location site is located at the extreme north portion of the WPAFB east of Haddix Road and north of State Route 235. The site is bordered by properties used for light industrial purposes to the north and south. A substantial residential development exists approximately 1500 feet south/southeast of the site (south of Sandhill Road). The property is considered open space.

The Sandhill alternative is located at a topographic highpoint in the local area, and is one of the few locations on and near the base which does not fall within either the 100 or 200 year floodplain. The location proposed for the EOD operations is at approximately 873 feet MSL. The surrounding land slopes to the southwest to an elevation of approximately 854 feet MSL across the 500 foot clear zone. The physical property proposed for development of the EOD site is not currently in active use by WPAFB. Historic uses of the immediate area surrounding the project site include a landfill (Landfill 9) located east of the proposed site previously operated by the WPAFB. Current uses in the immediate area include operation and maintenance of aircraft approach lights south of the proposed project location and agricultural operations.

The property, while physically within the boundaries of WPAFB, is accessed only through the use of public roads. The property is partially fenced with a gate restricting access at the existing gravel access road at Haddix Road. A separate entrance for use during EOD training exercises will be located off of Highway 235 based on WPAFB personnel reports. The alternate access would be desirable to minimize the off-site travel time and exposure of civilians to explosive materials during transport to the site.

3.6 SOILS

Surface soils at WPAFB formed on unconsolidated deposits, primarily alluvium, glacial outwash, glacial till, and loess. Forty separate soil mapping units occur on WPAFB (WPAFB 2007). However,

development and substantial earthmoving activities have altered the natural soil characteristics in many locations and consequently most of the base has been mapped as disturbed urban land complexes. Major soil complexes represented at WPAFB include: Warsaw-Fill land complex, Sloan-Fill land complex, Miamian-Urban land complex, Fox-Urban land complex, Linwood Muck, Westland-Urban land complex, and Warsaw-Urban land complex.

The project area for the Proposed Action and each alternative includes grounds to be occupied by the EOD facilities plus the 500 foot clear zone that would be managed around each site for safety.

3.6.1 Proposed Action: Skeel Avenue Site

Soils within the project area at this alternative are comprised exclusively of the Westland urban land complex, a generally very poorly drained soil that developed in deep (> 60 inches) loamy glacial outwash (NRCS 2007). Slopes on the soil are generally less than 2 percent. Available water within the upper 60 inches of the soil profile is very high. Therefore, Westland urban land complex is frequently ponded. Westland urban land complex also consists primarily of altered and covered areas of soil. Most areas are used for urban and industrial development.

3.6.2 Alternative 1: Former EOD Site

Soils within the project area at this alternative are predominantly (98 percent) Sloan-Fill land complex with minor amounts (about 2 percent) of Linwood Muck along the extreme eastern edge of the clear zone. The Sloan-Fill land complex is comprised of roughly equal parts of disturbed, anthropogenic fill material and Sloan soils (silt loams and silty clay loams) (NRCS 2007). Slopes are generally negligible in the fill component of the complex and less than 2 percent in the Sloan component. The fill soils are generally deep (> 60 inches to root restricting layer), with low available water, low shrink-swell potential, and no zone of water saturation within 72 inches of the surface. Ponding or flooding does not normally occur within the fill component of the complex.

Conversely, soils within the Sloan component are generally very poorly drained, with high available water within the upper 60 inches of the soil profile and a seasonally high water table within 6 inches of the soil surface from November to June (NRCS 2007). This soil is developed in a floodplain environment in deep (>60 inches) alluvium and is frequently flooded. It meets the criteria for a hydric soil, but is not normally ponded. There is a moderate potential for shrink-swell movement within this soil due to the clay content and seasonal saturation of the profile.

Linwood muck soils occur only in the extreme eastern edge of the project area where the 500 foot clear zone overlaps with grounds associated with the clear zone of the active airfield (east of Riverview Road). It is assumed that these soils have been previously subject to activities substantially similar to those expected to take place during establishment of the EOD clear zone. A description of the Linwood muck is provided in Alternative 2.

3.6.3 Alternative 2: Hebble Creek Road Site

Soils within the project area at this alternative are comprised exclusively of the Linwood muck, a generally very poorly drained soil that developed in deep (> 60 inches) loamy glacial outwash (NRCS 2007). Slopes on the soil are generally less than 2 percent. Available water within the upper 60 inches of the soil profile is very high and there is normally a seasonally high water table within 6 inches of the soil surface from November to June. Linwood muck meets the criteria for a hydric soil and is frequently ponded. The shrink-swell potential of this soil is considered low, but organic matter content in the surface horizon of this soil is high (about 60 percent), making this soil sensitive to compaction. Prior to European settlement of this area, Linwood muck likely supported a mosaic of grassland and wetland communities (wet prairies and sedge meadows) where it occurred in the vicinity of WPAFB, but was typically heavily modified by agricultural drainage projects and conversion to arable cropland or pastures.

3.6.4 Alternative 3: Sandhill Location

Soils within the project area at this alternative are mapped primarily as Udorthents, a loamy to clayey soil type that has little to no development of soil horizons due to factors such as repeated disturbances or very shallow bedrock that inhibits pedogenic development (NRCS 2006). This soil type encompasses about 75 percent of the project area, with lesser amounts of Ritchey silt-loam located in the eastern part of the 500 foot clear zone. A full soil description has generally not been developed by the NRCS for the Udorthent soils (NRCS 2007). Although classified as well-drained with very low water availability in the upper 60 inches of the profile, several wetlands have recently developed on this soil type in the Sandhill Location, possibly due to recent hydrology changes from closure of a quarry operation (WPAFB 2007). Due to the generally poor soil development and higher clay contents, this soil should be considered as potentially highly erodible on slopes where bare ground is exposed to water or vegetative cover is significantly disturbed.

The Ritchey silt-loam is located in the eastern part of the clear zone in a rolling to hilly section of the Sandhill Location area. This soil type is also classified as well-drained, with very low available water in the upper 60 inches of the profile, and a moderate shrink-swell potential (NRCS 2007). However, the

depth to bedrock is shallow in many locations (10 to 20 inches below the surface), with moderately high water movement in the confining subsurface lithic layers. This soil type is considered highly erodible, with slopes that range from 12 to 18 percent.

Additional soil types that occur along the proposed new access road to the Sandhill Location site include the Casco-Eldean loam, Eldean silt loam, and Warsaw loam. All of these soils are classified as prime farmland (NRCS 2007) and are present within the existing agricultural property that would be crossed by the access road. Although the Casco-Eldean loam is considered moderately erodible with slopes of 12 to 18 percent, the terrain that encompasses this soil type in the vicinity of the new road is relatively flat. Both the Eldean silt loam (2 to 6 percent slopes) and the Warsaw loam (0 to 2 percent slopes) are considered to have little or no erosion hazard. None of these soils has been classified as meeting hydric soil criteria.

3.7 CULTURAL RESOURCES

WPAFB has an active cultural resources management program that is administered by the Environmental Management Division of the 88 ABW and coordinated with the Ohio State Historic Preservation Officer (SHPO) under Section 106 of the National Historic Preservation Act. The WPAFB cultural resources management program is guided by an Integrated Cultural Resources Management Plan (ICRMP) that provides a programmatic basis for compliance with federal historic preservation law and Air Force historic preservation policy directives and instructions (WPAFB 2006). The ICRMP is periodically updated to remain current and underwent a major revision in 2006.

Since 1990, WPAFB has undertaken several extensive field surveys to inventory historic properties on the base. A number of these properties are currently listed, eligible, or potentially eligible for inclusion on the National Register of Historic Places (NRHP), to include several pre-historic and historic archaeological sites, approximately 260 historic buildings (primarily dating to WWII or earlier) and three historic districts (including one historic military housing district). Details of the archaeological field surveys, historic building surveys, and assessments of the historic districts are contained in the ICRMP (WPAFB 2006). Based on the results of the previous surveys and the high level of disturbances from past activities in many areas of the base, all of the grounds within the Proposed Action and Alternatives are regarded as having been surveyed for cultural resources (WPAFB 2006).

Per a 22 Jun 2009 correspondence from OHPO, concurrence was received that historic properties were appropriately identified by WPAFB within and adjacent to the area of potential effect (APE) for each of

the proposed EOD locations. Also correspondence from the City of Fairborn (10 Nov 08), National Park Service (NPS) Midwest Region (26 Nov 08), NPS Dayton Aviation Heritage National Historical Park (1 May 09), and the National Aviation Heritage Alliance (NAHA) (5 May 09) do not specifically concur nor nonconcur with the identification of historic properties in the APE. However, it is clear from each agencies response that they did not identify additional historic properties not already considered in WPAFB's APE for the four proposed EOD range locations. Appendix A contains copies of the above correspondence.

In addition to the three historic districts, WPAFB is also the home of Huffman Prairie Flying Field, site of the Wright brothers' development and testing of the world's first practical airplane and location of the Wright Brothers School of Aviation. Huffman Prairie Flying Field is a National Historic Landmark listed on the NRHP and is one of four "Dayton Aviation Sites" identified on the US World Heritage Tentative List.

As part of the Dayton Aviation Heritage National Historical Park the property is owned by the Air Force but is operated by the National Park Service (NPS). WPAFB and NPS have an agreement that allows daily public access to the flying field, with designated exceptions reserved for military use. Currently, public access to the Flying Field is provided through a non-secure road located off of State Route 444 along the southwestern boundary of Area C. However, during times of elevated threat levels or as demanded by the military mission, the installation can limit access to the site as necessary to maintain security.

To evaluate potential safety concerns and structural impacts associated with surrounding buildings from detonation impact, blast calculations were conducted by WPAFB. The blast calculations were conducted by a licensed professional engineer (P.E.) using appropriate modeling software (Blast/FX v.2.2). The calculations were conducted assuming the maximum quantity of explosives (5 pounds C-4) that would be detonated inside the six-foot tall vented concrete barricade during the training operations. The blast analysis used a 100 foot standoff distance from the detonation point to assess these potential damages. The model analysis revealed that structural damage of the barricade walls would not be expected and that the shock front can be expected to quickly dissipate at the 100 foot standoff distance. Historic structures located outside of the 500' clear zone are, therefore, not expected to be at risk of structural damage from EOD training operations.

In accordance with Section 106 of NEPA, formal consultation with the Ohio Historic Preservation Office (OHPO) was sought to determine whether the Proposed Action posed significant adverse impacts to the

cultural resources in the vicinity of the four alternative locations. The results of consultation are included in Appendix A.

3.7.1 Proposed Action: Skeel Avenue Site

No cultural resources are known to occur within the location for the proposed EOD facilities or within the required 500 foot clear zone.

Grounds with the potential to yield archaeological resources were evaluated in 1994-1995 by the Great Lakes Archaeological Research Center (WPAFB 2006). No properties eligible or potentially eligible for inclusion in the NRHP were identified during the field surveys within the proposed EOD facility location, the 200 foot combustible free zone, or the 500 foot clear zone. One historic residential site (R8 T3 S32 #14) inside the active airfield (near the access road for this alternative) was found to be heavily disturbed and determined to ineligible for the NRHP. The Ohio SHPO concurred with this determination based upon review of the ICRMP (WPAFB 2006).

A small portion (6.0 acres) of the Huffman Prairie Flying Field falls within the 129 dB contour for projected blast noise. This noise contour extends up to 350 feet inside the fenceline that marks the eastern boundary of the HPFF (Figure 3.7.1-d). A replica of the 1905 hangar used by the Wright Brothers is located outside of the projected noise contours for the EOD facility, about 230 feet to the west of the 129 dB noise contour.

The projected noise contours for the project also encompass a portion of the Brick Quarters Historic District, which is located about 2200 feet to the east of the proposed EOD detonation location. Noise conditions are further described in Section 3.9 of this EA. About 17.1 acres fall within the 129 dB projected noise contour for the EOD facility. The Brick Quarters Historic District, which is eligible to be listed on the NRHP, contains 123 contributing buildings and one contributing structure (turtle pond), that were built between 1935 and 1937 (WPAFB 2006). Located in the northeast side of Area A, this historic district is an active military family housing area consisting of officers' housing with detached and semidetached garages, an Officers' Club, and related service facilities. Contributing buildings to the Brick Quarters Historic District that fall within the 129 dB noise contour include facility numbers 10616, 10619, 10621, 10700, 10701, 10702, 10704, 10706, 10712, 10715, 10716, 10800, 10860, 11541, 11542, 11548, 11549, 11550, 11551, 11552 and 11553.

3.7.2 Alternative 1: Former EOD Site

No cultural resources are known to occur within the location for the project area (200 foot combustible free zone plus proposed EOD facilities) or within the required 500 foot clear zone. An archaeological field survey completed within the grounds encompassing the project area in 1994-1995 (WPAFB 2006) did not reveal any properties eligible or potentially eligible for inclusion in the NRHP.

3.7.3 Alternative 2: Hebble Creek Road Site

No prehistoric or historic archaeological resources are known to occur within the location for the project area (200 foot combustible free zone or proposed EOD facilities) or within the required 500 foot clear zone. Grounds within the vicinity of this area with the potential to yield archaeological resources were evaluated in two separate field surveys in 1994-1995 and 2002 (WPAFB 2006). No properties eligible or potentially eligible for inclusion in the NRHP were identified during the field surveys. Additional archaeological field surveys have not been conducted within this alternative project area due to pervasive ground disturbances associated with past military operations. The Ohio SHPO concurred with this determination based upon review of the ICRMP (WPAFB 2006).

However, the Huffman Prairie Flying Field (HPFF), a registered National Historic Landmark is located approximately 900 feet east of the proposed location of the EOD facilities for this alternative (see Figure 3.7-1-b). The 200 foot combustible free zone for this alternative would extend to within approximately 700 feet of the HPFF. In addition, a portion of the HPFF falls within the blast noise contours associated with operation of the proposed EOD facilities. Noise conditions are further discussed in Section 3.9 of this EA. A small portion of HPFF (up to 350 feet inside the fenceline that marks the field's western boundary) falls within the 136 dB contour for projected blast noise and the majority of the HPFF, including a number of the trails, interpretative facilities, and parking areas, falls within the 129 dB noise contour. A replica of the hangar used by the Wright Brothers for equipment and airplane storage is located about 100 feet east of the 129 dB noise contour.

Preliminary responses provided by the SHPO in response to the request for consultation have included a concern that location of the proposed EOD range at this alternative site will have significant and permanent effects on the use of the National Park. They have strongly encouraged WPAFB to select another location for development of the EOD range and recommended further study and consultation prior to rendering final comments.

3.7.4 Alternative 3: Sandhill Location

No cultural resources are known to occur within the location for the proposed EOD facilities or within the required 500 foot clear zone. Grounds to the south and west of this area with the potential to yield archaeological resources were evaluated in two separate field surveys in 1994-1995 and 2000 (WPAFB 2006). One historical archaeological site (33GR1032) and one prehistoric archaeological site (33GR890) were identified during the field surveys and both were determined to be ineligible for inclusion in the National Register of Historic Places. No additional archaeological field surveys were conducted within the vicinity of Alternative 3 due to pervasive ground disturbances associated with past operations of a landfill and quarry operations. The Ohio SHPO concurred with this determination based upon review of the ICRMP (WPAFB 2006).

3.8 AIR QUALITY

Wright Patterson Air Force Base (WPAFB) is located in the Dayton, Ohio Area. Winds are predominately from the south or southwest. A summary of climate data obtained from the National Oceanic and Atmospheric Administration (NOAA) at the Dayton International Airport is included below:

Table 3.8: Climatological Conditions

Month	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	Average Precipitation (inches)
January	34.4	19	2.6
February	39.1	22.4	2.29
March	50.2	31.2	3.29
April	61.8	40.4	4.03
May	72.2	51.2	4.17
June	81	60.3	4.21
July	84.9	64.4	3.74
August	83	62.3	3.49
September	76.3	54.7	2.65
October	64.3	43.6	2.72
November	51	34.4	3.30
December	39.9	24.4	3.08

While modeling was not within the scope of this evaluation, of the four alternatives discussed in the following sections, it should be noted that the predominant wind direction will likely carry pollutants, if present, from the Sandhill Area and the Skeel Avenue Site into adjacent residential areas while pollutants from the Hebble Creek Road Site and Former EOD area will be carried to other areas of WPAFB.

In accordance with the Clean Air Act (CAA), the United States Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS). The NAAQS are designed to help protect human health and public welfare and limit the emissions of six criteria pollutants including: sulfur dioxide (SO₂), nitrogen oxides (NO_x), particulate matter (PM), carbon monoxide (CO), ozone, and lead. In accordance with the CAA, states must develop a state implementation plan (SIP), which includes a set of regulations that the state enforce in an attempt to meet the NAAQS standards.

The Ohio EPA is responsible for developing and implementing a SIP to ensure the NAAQS are met including ambient air monitoring. WPAFB is located in the Dayton/Springfield area which is considered to be in attainment for all NAAQS parameters with the exception of 8 hour ozone and particulate matter less than 2.5 microns in size (PM_{2.5}). In order to meet the NAAQS standards, the Ohio EPA has developed a set of regulations which include exemptions for de minimus levels of emissions as well as some exempted activities. De minimus standards are air emissions levels where it is assumed no substantial degradation to air quality would occur.

In 2004, WPAFB was issued a Title V air quality operating permit identifying all major sources of air pollutants. Emissions due to the operation of the EOD facility are expected to be limited to those generated by portable generators used at the selected site. A permit to install application will not be required.

3.8.1 Proposed Action: Skeel Avenue Site

The Skeel Avenue Site is located the eastern portion of WPAFB southeast of the airstrip. The site is located slightly less than 3000' upwind from a residential area east of the base. Considering predominant wind direction (from southwest), emissions and/or odors which may occur from EOD activities have the potential to migrate off-site toward this residential development.

3.8.2 Alternative 1: Former EOD Site

The former EOD location is situated between Riverview Road and the Mad River on the western edge of Area C. The predominant wind would generally direct potential emissions and/or odors resulting from operation of the EOD activities toward the WPAFB airfield. Off-site migration of emissions is unlikely from this proposed location.

3.8.3 Alternative 2: Hebble Creek Road Site

The Hebble Creek Road Site is located between Marl Road and Hebble Creek Road. The predominant wind would generally direct potential emissions and/or odors resulting from operation of the EOD activities toward the north-northeast. Off-site migration of emissions is unlikely from this proposed location, however, if they occur, emissions may be directed toward the Huffman Prairie Flying Field which is frequented by the general public as a tourist attraction.

3.8.4 Alternative 3: Sandhill Location

The Sandhill Location is located at the northernmost end of WPAFB. Should emissions and/or odors occur from EOD activities, off-site migration toward a residential development is feasible.

3.9 NOISE

Sound is a waveform that travels through media including air, water and structural materials such as wood and steel. The level of noise impacts are based on the magnitude of one or more of the noise characteristics, namely, sound level (amplitude), frequency (pitch), and duration. The amplitude of a sound wave is equivalent to what we perceive as loudness. Since sound is a compression wave, its

loudness or amplitude would correspond to how much the wave is compressed. A common measurement of loudness is the decibel (dB). Frequency is the rate that the maximum compressions pass a given point in a second. The unit of frequency is the hertz (Hz), Audio frequencies are those that are within the human range of hearing (approximately 20 Hz to 20,000 Hz).

Amplitude is further refined by including frequency as a “weighting” factor. An Operational Noise Manual prepared by Operational Noise Program Directorate of Environmental Health Engineering - U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), for DOD facilities, describes A-weighted as the primary descriptor of sounds detected by humans (dBA) which is generally 1,000 to 4,000 Hz range. The manual also describes C-weighting which is used for intense low frequency signals (near or below the threshold of human hearing) such as munitions blasts that tend to create building rattles and vibrations. An explosion causes a sudden surge in air causing a high-volume sound. The spectra of military explosives usually contain more low frequency sounds as opposed to the confined explosions of guns. The typical spectrum from a 5 lb. charge of plastic explosive (C4) has the most energy at 31 Hz. Since humans detect noises best which are greater than 1000 Hz, these explosions are often not perceived as being relatively loud. Such low frequencies can travel much longer distances than can higher frequency sounds because they are less likely to be absorbed by other materials in their path.

The spectrum of uncontained explosions is related to the size of the explosion in that the larger the explosion, the lower the spectrum. Thus, charges smaller than 5 lbs. have a spectrum peaking at a frequency higher than 31 Hz, and charges larger than 5 lbs. have a spectrum peaking at a frequency lower than 31 Hz. When explosions have a spectral energy below 20 Hz (like those near demolition grounds, bombing ranges, or artillery impact areas) people barely notice an explosion when outdoors but, because of induced vibrations, become intensely aware of the vibrations when they step inside their homes. Based on the above discussions, an adverse noise impact is possible with the potential for structural damage, and annoyance to public.

The Air Installation Compatible Use Zone (AICUZ) study report for WPAFB Base, prepared in 1995 provides noise contours based on the Day-Night Average A-Weighted Sound Level (DNL) metric, adopted by the Environmental Protection Agency (EPA) as the standard noise prediction metric. The AICUZ report contains noise contours plotted in increments of 5 dB, ranging from DNL 65 dB to DNL 80 dB. With the exception of the Skeel Avenue location, which is located in the 75 dB contour, all of the proposed locations are located within the 80 dB contours established by the AICUZ (WPAFB, 1995).

The Naval Surface Weapons Laboratory (NSWL), in Dahlgren, Virginia published a noise manual which included reference sound level dB peaks for use in determining potential risk of complaints. Pertinent tables are included below:

Table 3.9a: Noise Complaint Prediction Guidelines: Naval Surface Weapons Center

Predicted Sound Level, dB Peak	Risk of Complaints	Action
< 115	Low	Fire all programs
115 – 130	Moderate	Fire important tests. Postpone non-critical testing, if feasible.
130 – 140	High, possibility of damage	Only extremely important tests should be fired.
> 140	Threshold for permanent physiological damage to unprotected human ears. High risk of physiological and structural damage claims	Postpone all explosive operations.

(Source: Noise Manual, USACHPPM)

An environmental assessment prepared for a proposed EOD Demolition Training Range at the Seaplane Base, NASWI (July 2000) notes that noise levels were measured during a test of a 5-lb detonation at Fort Lewis in Washington State in 1999. The table below provides the measured levels:

Table 3.9b: Measured 5-lb Explosive Source Noise Levels

Location	Unweighted peak (dB)	C-weighted L_{max} (dB-C)	A-weighted L_{max} (dB-A)
At 1,250 ft	136	124	99
At 3,000 ft	129	118	83

(Source: After measurements at Fort Lewis, Washington State; cited in Environmental Assessment – EOD Demolition Training Range, Seaplane Base, NASWI, Department of Navy, July 2000)

Depending on the magnitude of peak noise levels, as well as frequency (Hz), duration, meteorological conditions, time of day, number of detonations per day and week, and specific receptor location, the increased peak noise could cause impacts ranging from annoyance to short-term pain.

From the above tables, it can be concluded that, as a conservative estimate, un-weighted peak noise levels of 129 dB at 3,000 feet away from detonation point will result in moderate complaints, and therefore will require only firing “important tests”. The subjectivity of “important tests” may be equated to EOD

training for 8 hours a day, three times per week. Based on this assumption, potential environmental consequences and mitigation measures are discussed in Section 4.9. Both the amount of noise and the duration of time a person is exposed to the noise determine its ability to damage hearing. The higher the decibel level, the louder the noise. Sounds greater than 80 dB pose the potential for hearing loss. The noise chart provides a basis of average decibel levels for everyday sounds to which people are exposed (Source: American Speech-Language-Hearing Association).

Painful

150 dB = rock music peak
140 dB = firearms, air raid siren, jet engine
130 dB = jackhammer
120 dB = jet plane take-off, amplified rock music at 4-6 ft., car stereo, band practice

Extremely Loud

110 dB = rock music, model airplane
106 dB = timpani and bass drum rolls
100 dB = snowmobile, chain saw, pneumatic drill
90 dB = lawnmower, shop tools, truck traffic, subway

Very Loud

80 dB = alarm clock, busy street
70 dB = busy traffic, vacuum cleaner
60 dB = conversation, dishwasher

The project areas for each alternative include grounds to be occupied by the EOD facilities plus the 200 foot combustible free zone that would be managed around each site for fire safety. In addition, the 500 foot clear zone is evaluated for the Proposed Action (Skeel Avenue Site) for purposes of assessing the potential environmental impacts of vegetation management on the Huffman Prairie. Known suitable habitat for threatened and endangered species and species occurrences within each project area were analyzed using a geographic information system (GIS). The projected 136 dB (inner) and 129 dB (outer) noise contours are also included in the GIS analysis of the project area for each alternative. Only spatial data for threatened and endangered wildlife was examined for this analysis. The consideration of suitable habitat was limited to WPAFB, as information was not available for areas of private lands located outside the base.

3.9.1 Proposed Action: Skeel Avenue Site

The Skeel Avenue site is located within the 75 dB contour as reported in the AICUZ. The 136 dB (unweighted peak) contour which will result from detonations at the proposed EOD range (Figure 3.9.1) extends 1250 feet from the center of the proposed EOD facility and includes approximately 30 acres (or about 27.5 percent) of the Huffman Prairie Natural Landmark. The 129 dB (unweighted peak) contour extends 3000 feet from the center of the EOD facility and includes approximately 102.3 acres (or about 93.85 percent) of the Natural Landmark. For the entire Huffman Prairie (to include previously restored areas), the 136 dB (unweighted peak) contour covers 41.3 acres (about 33 percent) of the total prairie habitat and the 129 dB contour covers 116.1 acres (about 90 percent) of the available prairie habitat. In addition to wildlife habitat, the northwestern section of the Brick Quarters Historic District is located within 3,000 feet of the proposed detonation point (Figure 3.9.1), and within the 129 dB contour.

The projected noise contours for the project include minor amounts of suitable habitat for the Indiana bat and bald eagle. A total of 3.219 acres of Indiana bat habitat fall within the projected 129 dB contour (Figure 3.2.3-.1a). This habitat is located within a narrow wooded corridor about 2300 feet to the southwest of the proposed EOD facility. A total of 3.219 acres of bald eagle habitat also fall within the projected 129 dB contour (Figure 3.2.3-.1b). The suitable bald eagle habitat overlaps with the Indiana bat habitat in the same location to the southwest of the Proposed Action.

3.9.2 Alternative 1: Former EOD Site

The former EOD site is located within the 80 dB contour as reported in AICUZ (WPAFB, 1995), and includes a much larger and more diverse area of wildlife habitat than the Skeel Avenue Site (Figure 3.9.2). The 136 dB (unweighted peak) contour extends 1250 feet from the center of the proposed EOD facility and includes approximately 115 acres of open grounds, forest, and aquatic habitats. The 129 dB (unweighted peak) contour extends 3000 feet from the center of the EOD facility and includes approximately 664 acres of grounds both on and off the base. The primary potential impact from locating the range at this location is disturbance of wildlife. Habitats which may be affected located on WPAFB within this contour include upland forest, floodplain forest, open managed grounds, old fields, and aquatic habitat. Although data is not available for lands located outside the WPAFB boundary, the aerial photography suggests that these wildlife habitats are generally similar to those on the base, with exception of agricultural and developed lands west of State Route 4.

3.9.3 Alternative 2: Hebble Creek Road Site

The Hebble Creek Road alternative site (Figure 3.9.3) is located such that the 136 dB (unweighted peak) contour extends 1250 feet from the center of the proposed EOD facility and includes approximately 115 acres of primarily open grounds and old field habitats, with a scattered cover of upland forests. The 129 dB (unweighted peak) contour extends 3000 feet from the center of the EOD facility and includes approximately 664 acres of forest (primarily upland), open grounds, old fields, and improved grounds (to include a base golf course). Almost all of the grounds encompassed by the 129 dB contour are located on WPAFB, with only a minor amount of forest habitat outside the base on the extreme southern edge of the contour. Both noise contours for this alternative include portions of the grassy field associated with the Huffman Prairie Flying Field (located about 1000 feet east of the edge of the clear zone). However, the 136 db contour does not extend into the Huffman Prairie State Natural Landmark, which is located approximately 3115 feet from the center of the proposed EOD facility.

The projected noise contours for the project include suitable habitats for the Indiana bat, bald eagle, and eastern massasauga rattlesnake. A total of 196.09 acres of Indiana bat habitat fall within the projected noise contours; 28.75 acres are inside the 136 dB contour and 167.34 acres are inside the 129 dB contour (Figure 3.2.3-.3b). Most of this habitat is located to the north, west, and south of the proposed EOD facility. A total of 184.41 acres of bald eagle habitat fall within the projected noise contours; 27.90 acres are inside the 136 dB contour and 156.51 acres are inside the 129 dB contour. Most of the suitable bald eagle habitat is also co-located with the Indiana bat habitat to the north, west, and south of the proposed alternative. A total of 216.32 acres of eastern massasauga rattlesnake habitat fall within the projected noise contours; 19.24 acres are inside the 136 dB contour and 197.08 acres are inside the 129 dB contour. All currently known eastern massasauga rattlesnake habitat occurs south of Hebble Creek Road in the Prime Beef Training Area and Twin Base Golf Course (WPAFB 2007). This habitat is located approximately 600 feet south of the center of the proposed EOD facility at this alternative.

3.9.4 Alternative 3: Sandhill Location

The Sandhill alternative (Figure 3.9.4) is located such that the 136 dB (unweighted peak) contour extends 1250 feet from the center of the proposed EOD facility and includes approximately 115 acres of developed agricultural land, shrubby upland, upland forest, open fields, and emergent wetland habitats. About one-half of the grounds encompassed by the 136 dB noise contour are located outside WPAFB. Although data is not available for lands located outside the WPAFB boundary, analysis of the aerial photography suggests that the forest habitat is generally similar to contiguous forests on the base. A large

area of previously disturbed, strip-mine habitat is located to the northeast of the base. A small area of developed commercial land is also located northwest of the WPAFB boundary. The 129 dB (unweighted peak) contour extends 3000 feet from the center of the EOD facility and includes approximately 664 acres of grounds both on and off the base. Grounds within this contour include the above habitat types plus aquatic (open water) habitat. Additionally, an established residential area is located within the 129 dB contour.

The projected noise contours for the project include suitable habitats for the Indiana bat, and bald eagle. A total of 46.30 acres of Indiana bat habitat fall within the projected noise contours; 15.51 acres are inside the 136 dB contour and 30.79 acres are inside the 129 dB contour (Figure 3.2.3-.4a). Most of this habitat is located to the west and south of the proposed EOD facility. A total of 9.20 acres of bald eagle habitat fall within the projected noise contours; 1.90 acres are inside the 136 dB contour and 7.30 acres are inside the 129 dB contour (Figure 3.2.3-.4b). The suitable bald eagle habitat is located to the west of the proposed alternative.

In addition, the 129 dB noise contour includes approximately 4.57 acres of upland sandpiper habitat. This habitat is located along the southeastern margins of the noise contour and falls within semi-improved grounds managed for active airfield.

3.10 HEALTH AND SAFETY

The proposed EOD activities at each of the four locations are inherently dangerous as even controlled detonation of explosives can be injurious to those involved and pose potential hazards to nearby operations. WPAFB serves as the hub of transportation for military aircraft and it has established aircraft Accident Potential Zones in which potentially harmful activities are strictly limited. As such, the Air Force recommendation is to limit the number of people exposed through selective land use planning. Three zones have been established based on accident potential studies (Figure 3.10):

- the Clear Zone (CZ): The clear zone starts at the end of the runway extending outward 3,000 feet
- Accident Potential Zone I (APZ I): extends 5,000 feet from the CZ boundary
- Accident Potential II (APZ II): extends 7,000 feet from APZ I boundary

Section 1.4.4 of the AICUZ Program Manager's Guide (Air Force Handbook 37-7084, 1999) states that of the accidents occurring within 10 miles of a military airfield, 62% occurred either on or adjacent to the

airfield (CZ) while only about 8% occurred in APZ I and 5% in APZ II. It was concluded that the CZ warranted special attention due to the high incident of accident potential that severely limited acceptable land uses.

Appendix A.6 of the AICUZ (WPAFB, 1995) has established land use guidelines for APZs 1 and 2 which demonstrate the intent to limit the following land uses in these restricted zones as follow:

1. Have high residential density characteristics
2. Have high labor intensity
3. Involve above-ground explosives, fires, toxic, corrosive, or other hazardous characteristics.
4. Promote population concentrations
5. Involve utilities and services required for area-wide population, where disruption would have an adverse impact (telephone, gas, etc).
6. Concentrate people who are unable to respond to emergency situations, such as children, elderly, handicapped, etc.
7. Pose hazards to aircraft operations.

Similarly, the Air Force has established Explosives Safety Standards in Air Force Manual 91-201; 18 November 2008 (AFMAN 91-201) which specifies isolation distances to be maintained for all activities involving explosives. A 500 foot isolation distance from EOD facilities is required for all runways, public roads, above ground utilities, etc.

In addition, the Occupational Safety and Health Administration (OSHA) has established standards for exposure of workers to noise and airborne contaminants. While no noise or chemical exposure studies were completed within the context of this EA, WPAFB should assess the necessity for proper protective equipment in the course of establishing procedures for operation of the EOD facility.

Overblast pressure calculations were conducted (Appendix E) to determine if ordnance detonation is likely to affect the integrity of structures in the vicinity of the proposed EOD range or pose a safety concern resulting from concussion from detonation. The results of calculations are discussed in Section 4.10 of this EA.

3.10.1 Proposed Action: Skeel Avenue Site

The proposed location is situated outside of the Aircraft CZ, APZ1 and APZ2 (Figure 3.10). The location is adjacent to and overlaps on the Huffman Prairie, an Ohio Natural Landmark. Public use area such as walking trails are present on the Prairie property, although access would be controlled within 500' of the EOD range should this location be selected.

The Proposed Action is located within the quantity distance arcs (arcs) of Hazardous Cargo (hazcargo) Pads 1-4. The pads, as well as stubs 8a and 8b are used as temporary (1 – 3 days) flightline munitions holding areas for limited quantities of munitions. Limitations of EOD range use during storage are discussed in Section 4.10.

3.10.2 Alternative 1: Former EOD Site

The Former EOD Site is located southwest of the airstrip (Figure 1.1). The detonation point for ordnance at this location is outside of the APZ1, however, the 500 foot clear zone from the EOD facility overlaps significantly with APZ1 (Figure 3.10).

The site is located off of Riverview Road which is restricted to use by base and other authorized personnel. The road is located within the 500 foot isolation distance identified in AFMAN 91-201. While not designated as a public road, WPAFB will wish to evaluate whether the EOD site would be required to be 500 feet from the on-site road. If it is determined that the non-public use road must meet the same safety isolation distance as a public use road, Riverview Road and the northernmost section of Symmes Road would need to be closed (at least during training activities) if the EOD operation is sited in this location.

3.10.3 Alternative 2: Hebble Creek Road Site

The proposed location is situated outside of the Aircraft CZ, APZ1 and APZ2 (Figure 3.10). The location is adjacent to the Huffman Prairie Flying Field (HPFF), a public use area operated by the National Park Service (NPS) and accessed by a public use road (Hebble Creek Road). Structures at the park include a hangar designed as a reproduction of the original hangar used by the Wright Brothers at this location and storage facility maintained by the NPS. WPAFB has the ability to restrict access to the public road as it may be necessary or critical to its mission.

No significant clearing of combustible material will be required at this location, as the area is currently planted in cool season grasses and will be periodically mowed to control unintended ignition.

3.10.4 Alternative 3: Sandhill Location

This alternative location is situated entirely within the APZ1 (Figure 3.10) northeast of the runway in the line of approach. Based on the high accident potential in aircraft approach and departure areas, activities which involve the use of explosives are prohibited in designated APZ1 zones as follow:

Table 3.10.4: Prohibited Activities in APZI

Reference Document	Prohibited Activity	
UFC 3-260-01 SECTION 3	Activities which produces smoke, glare, or involve explosives are prohibited in APZI / II	A waiver would be required in order to conduct EOD activities at this alternative location
UFC 3-260-01 B9-3	Explosives and explosive facilities are prohibited from being located in Accident Potential Zones (APZ) I and II and clear zones as set forth in AR 385-10; DAPAM 385-64, Chapter 5; AFMAN 91-201; and AFI 32-7063.	
UFC 3-260-01 and AFMAN 91-201, 12.39.3	Activities involving explosives are prohibited from Accident Potential Zones (APZ) I and II and clear zones (CZ) of all aircraft landing facilities as depicted and described in UFC 3-260-01, <i>Airfield and Heliport Planning and Design</i> and defined by the MAJCOMs	

As such, the proposed EOD range is considered a prohibited land use at this location due to safety concerns posed by the incompatibility of these two functions. A waiver from AFMAN 91-201 and UFC3-260-01 would be required at this alternative location.

3.11 SOCIOECONOMICS

WPAFB is the largest employer in the region. WPAFB has a work force numbering approximately 20,000 people, and employs nearly 1 in 12 people in the greater Dayton area, making it the 5th largest employer in Ohio, and the largest employer at a single location. Approximately 92 percent of WPAFB's military and civilian employees live in the Dayton-Springfield Ohio Metropolitan Statistical Area (MSA) that includes Greene, Montgomery, Clark, and Miami counties.

The base has an annual payroll of approximately \$1.25 billion. Annual expenditures by WPAFB, including services, equipment, materials, and supplies, total about \$1.35 billion. The value of secondary jobs created is estimated to be \$750 million, for a total economic impact of the base in the regional economy of \$3.4 billion. In 2005, approximately \$1.6 million of educational impact aid funds were distributed to five local school districts that serve children of active military and civilian employees (Source: Wright-Patterson Air Force Base (WPAFB). 2006a. *Heritage to Horizons, Economic Impact Analysis, Wright-Patterson Air Force Base, Ohio.*)

Statistics provided by the Ohio Department of Development and Federal Census Bureau indicate that the percent of the population below poverty level in 2000 in the area was lower than the national average. In 2004, however, per capita income in Ohio and in the four-county area was below the national average. Since 2002, Ohio's unemployment rate also has been consistently higher than the national rate. There is speculation that this drop is largely a result of the loss of manufacturing jobs throughout the state over the last few years. In general, Montgomery and Clark counties' poverty and unemployment rates are higher than the state average, while Greene County is lower than the state average (Table 3.11-1).

Table 3.11-1: Regional Economic Profile

	Average per Capita Income (2004)	Percent below Poverty Level (2000)	Percent Unemployment				
			2002	2003	2004	2005	2006
Greene	\$32,497	8.5	5.0	5.4	5.5	5.5	5.0
Montgomery	\$31,773	11.3	6.0	6.5	6.6	6.4	5.9
Clark	\$28,094	10.6	7.0	7.3	6.7	6.4	5.7
Miami	\$30,411	6.7	5.6	5.9	5.7	5.6	5.7
Ohio	\$31,161	10.6	5.7	6.2	6.2	5.9	5.4
United States	\$33,050	12.4	5.8	6.0	5.5	5.1	4.3

Population growth statistics for the four-county area are provided in Table 3.11-2. Greene and Miami counties show a slight increase in population, while Montgomery and Clark counties show a slight decrease in population. The estimated percent of vacant housing in 2004 for Greene, Montgomery, Clark, and Miami counties was 5.0 percent, 7.7 percent, 7.2 percent, and 5.2 percent, respectively (ODOD, 2006).

Table 3.11-2 Area Population Growth Statistics County	Total Population for 2000(a)	Estimated Population for 2004(b)	Percent Change in Population
Greene	147,886	152,233	2.9% increase
Montgomery	559,062	550,063	1.6% decrease
Clark	144,742	142,613	1.5% decrease
Miami	98,868	100,797	1.9% increase

a - U.S. Census Bureau (2000)

b - Ohio Department of Development (2006)

3.12 TRANSPORTATION

Hazardous materials are divided in 9 different hazard classes per 49 CFR with Explosives defined as Class 1. Within the Class 1 explosives there are six divisions representing separate groups based on the potential threat posed by the explosive. Division 1.1 is considered to be the most hazardous of the explosives while Division 1.6 is considered the least hazardous. Most common military munitions fall into division 1.3 or 1.4.

Division 1.3 explosives are defined in 49 CFR Part 172 as consisting of explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard. Division 1.4 explosives are similarly defined as explosives that present a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. Blocks of C4 and hand grenades could fall into either of these categories. However, TNT is categorized as a Division 1.1 explosive which has a mass explosion hazard, (ie, one which affects almost the entire load instantaneously).

49 CFR 177.848(f), describes segregation of explosives for storage and transportation. For example, TNT (Div 1.1D) cannot be transported with grenades (Div 1.3G or Div 1.4G). WPAFB personnel responsible for transporting explosives for the purpose of training exercises at the EOD facility must be properly trained in the USDOT Hazardous Materials Transportation requirements as well as the requirements outlined in the document entitled WPAFB Instruction 91-201 (WPAFB, April 22, 2005).

3.12.1 Proposed Action: Skeel Avenue Site

The Skeel Avenue Site is located within the perimeter of WPAFB. No transportation is required on public roads to deliver ordnance for training exercises if located at this site. Transportation would follow the requirements outlined in WPAFB Instructions 91-201 (WPAFB, April 22, 2005).

3.12.2 Alternative 1: Former EOD Site

The Former EOD Site is located within the perimeter of WPAFB. No transportation is required on public roads to deliver ordnance for training exercises if located at this site. Transportation would follow the requirements outlined in WPAFB Instruction 91-201 (WPAFB, April 22, 2005).

3.12.3 Alternative 2: Hebble Creek Road Site

The Hebble Creek Road Site is located within the perimeter of WPAFB. While Hebble Creek Road is made accessible to the public during limited hours, WPAFB maintains control of the road use. No transportation is required on public roads not under the control of the base to deliver ordnance for training exercises if located at this site. Transportation would follow the requirements outlined in WPAFB Instruction 91-201 (WPAFB, April 22, 2005).

3.12.4 Alternative 3: Sandhill Location

This location, while within the perimeter of WPAFB, requires off-site use of State Route 235 (Chambersburg Road) to access the proposed training site. Access to the proposed EOD site is planned from Chambersburg Road. This will require construction of an access road suitable for all-weather use by military vehicles. Approximately 1 – 2 miles of public highway will be used during transportation of explosives for training purposes.

3.13 UTILITIES

The EOD training facility does not consist of any buildings occupied by personnel during the training, and therefore does not require permanent water or wastewater utilities. Also, the training does not require

permanent communication, electrical and natural gas requirements. Therefore, the four alternatives have no need for utilities similar to a No Action Alternative. Only the Hebble Creek Road Site currently has overhead utility lines, however they will require re-location (Section 3.10.3). Existing utilities are represented in Figures 3.13a -3.13d.

3.14 ENVIRONMENTAL JUSTICE

The purpose of *EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, is to identify, address, and avoid disproportionately high and adverse human health or environmental effects on minority and low-income populations. The U.S. Census Bureau's 2006 American Community Survey information was referenced to identify potential Environmental Justice populations in the project areas.

For Greene County as a whole, minority populations comprise 11.3 percent of the population; in Montgomery County, the proportion of minority populations is 24.5 percent; Clark County has an overall minority population of 12.2 percent. These statistics are summarized in Table 3.14-1. Overall, the minority populations are lower in Greene County compared to the national average. The proportion of families below poverty level however is higher than national average in Montgomery and Clark Counties, which also has higher minority populations. Comparably, diversity is high within the WPAFB Census-Designated Place (CDP), and poverty level is less than 20 percent of the national average.

Table 3.14: Minority and Low Income Populations (in percent for Greene, Montgomery, Clark, and Miami Counties, Ohio, 2006)

Race/Ethnicity	United States	WP AFB Census Designated Place (CDP)	Greene County	Montgomery County	Clark County	Miami County
White	73.9	76.1	88.6	75.5	87.8	94.4
Black or African American	12.4	15.2	6.1	20.7	8.8	3.0
American Indian and Alaska Native	0.8	0.5	0.3	0.2	0.2	0.0
Asian	4.4	2.3	2.8	1.5	0.5	1.2
Native Hawaiian and other Pacific Islander	0.1	.1	0.0	0.0	0.0	0.0
Some other race	6.3	2.1	0.5	0.6	0.5	0.2
Hispanic or Latino (of any race) a	14.8	4.4	1.6	1.6	1.6	No data
Total Minority Populations	26.1	23.9	11.3	24.5	12.2	5.6
Proportion of Families with Income Below the Poverty Level	9.8	1.6	7.9	10.7	10.0	6.1

Source: U.S. Census Bureau, 2006 American Community Survey

a - Persons of Hispanic or Latino origin may be of any race; because of this, the sum of the percentages does not equal 100.

4.0 ENVIRONMENTAL CONSEQUENCES AND MITIGATION

4.1 INTRODUCTION

The Proposed Action and Alternative locations were evaluated to identify potential environmental effects which may result from the construction and operation of the proposed EOD site for the following resources and/or concerns: Natural Resources, Water, Hazardous Material, Land Use, Soils, Cultural Resources, Air Quality, Noise, Health and Safety Socio-economics, Transportation, Utilities and Environmental Justice. In addition, the No Action Alternative was considered in each of these areas of interest.

4.2 NATURAL RESOURCES

4.2.1 Vegetation

This section describes the potential effects of each project alternative on vegetation. For purposes of the EA, it was assumed that a 200-foot combustible-free zone would be established around the detonation point. The combustible-free zone is an area free of all readily combustible material, such as dry grass, leaves, standing trees, brush or dead wood. The effects of mowing of the 500 radius clear zone were evaluated for the Proposed Action (Skeel Avenue Site) only due to the unique nature of the tallgrass prairie for the purposes of this EA. Consultation with the USFWS and ODNR has been considered in this section. Consultation was initiated on 24 September, 2008 and completed on 2 October 2, 2009 (Appendix A).

4.2.1.1 Proposed Action: Skeel Avenue Site

Potential Environmental Effects

Minor adverse impacts to vegetation resources are expected under this alternative for construction of the EOD facility. About 0.5 acres of existing tallgrass prairie vegetation in the vicinity of the proposed EOD facility would be removed during site preparation activities and placement of the EOD barricade. Most of this disturbance would occur outside of the Huffman Prairie Natural Landmark, but inside the boundary of the restored portions of the Huffman Prairie. Any bare soil created by construction activities would be re-seeded with an appropriate mix of low-growing native prairie species to prevent further introduction of non-native plants into the Huffman Prairie. As with Alternatives 1, 2 and 3, these adverse impacts would be localized, but long-term in nature (over the life-cycle of the EOD facility).

Establishment and maintenance of the 200 foot combustible free and the 500 foot clear zones will result in varying degrees of adverse impacts to the vegetation resources within the project area. Under this alternative, the existing prairie vegetation within the combustible free zone will be maintained at a height of no more than six inches by periodic mowing. While initial mowing would probably not harm the native prairie vegetation present within the site, repetitive mowing throughout the growing season would, over time, likely weaken the vigor of native prairie plants and encourage the further spread of non-native plant species such as smooth brome and common teasel into interior portions of the Huffman Prairie. A total of 2.879 acres of prairie vegetation would be disturbed for the combustible free zone under this alternative, with 1.314 acres of that disturbance occurring within the Huffman Prairie Natural Landmark.

To limit access of the EOD facility by the public, a chain link security fence will be placed just outside the required 500 foot clear zone. This would result in minor adverse impacts to the existing prairie vegetation at locations where fence posts are placed. However, the proposal to mow all of the existing prairie vegetation within the 500 foot clear zone would result in the effective conversion of 7.507 acres (about 6.9 percent) of the tallgrass vegetation within the Huffman Prairie Natural Landmark and 16.163 acres (about 13 percent) of the tallgrass vegetation within the Huffman Prairie as a whole. In addition, mowing the entire 500 foot clear zone would create two small fragments of prairie habitat on the northwest (0.233 acres) and northeast (2.005 acres) margins of the clear zone (see Figure 3.2.1.1). These fragments would be difficult to effectively manage or restore given their isolation from the remaining prairie habitat and likely subject to future degradation from the further spread of invasive plants.

No impacts to vegetation are anticipated to occur in the existing 1.852 acres of grassland vegetation within the 500 foot clear zone that fall outside the boundaries of Huffman Prairie (see Figure 3.2.1.1). This area is currently maintained (regularly mowed) as cool-season grassland for security and operational purposes of the airfield and would continue to receive similar management under this alternative.

Mitigation Measures

The use of appropriate erosion control practices would be required during construction of the EOD facility to prevent sediment transport into adjacent vegetative communities. Should herbicides be used to control vegetation within or near areas designated as sensitive such as potential habitat for rare species (see Section 3.2.3), prior coordination with the base natural resources manager is required (WPAFB 2007). In addition, any herbicide use would conform to all base Integrated Pest Management (IPM) practices and herbicide labeling standards for mixing and application to minimize the potential for adverse impacts to off-site vegetation.

Any flammable or combustible materials such as duff, leaf litter and dried grass would be raked or manually removed from the 200 foot combustible free zone as necessary before commencement of EOD operations. Advance coordination would be also undertaken with the WPAFB Fire Department to assess the potential for adverse impacts to vegetation from wildfires and identify red flag conditions prior to commencement of any training or EOD operations at the site. Due to the unique conditions and low flash fuels of the surrounding tallgrass prairie vegetation, routine EOD training and operations would generally not be conducted during dry or windy days. Additional mitigation measures such as laying a wet line with water or having additional fire suppression equipment on-site would be evaluated as necessary to support operations during red flag conditions.

Planting or restoring additional areas of tallgrass prairie vegetation would mitigate the duration and extent of the potentially adverse effects on vegetation from mowing existing areas of the Huffman Prairie. A total of 2.879 acres of prairie mitigation would be required if only the 200 foot combustible free zone is mowed within the project area. However, a total of 16.163 acres would be required for prairie mitigation if the entire 500 foot clear zone is mowed. If the isolated fragments of prairie habitat (created by mowing the 500 foot clear zone) are determined to be unviable for further natural resources management purposes and also mowed, the amount of compensatory prairie mitigation increases to 18.401 acres. To the extent possible, appropriate local genotypes of native species should be selected for this mitigation and the plantings should be established in grounds contiguous to the Huffman Prairie to buffer the remaining core prairie habitat. The mitigation plans prepared outside of the scope of this EA should also include sufficient resources for post-installation monitoring and management to ensure successful establishment of the prairie plantings (generally three to five years). The INMRP will be revised to incorporate the mitigation measures selected to address these concerns.

4.2.1.2 Alternative 1: Former EOD Site

Potential Environmental Effects

The existing woody and herbaceous vegetation in the proposed project area (200 foot combustible free zone and EOD facility location) would be disturbed and removed during site preparation and construction activities. Preparing the site for construction and initial establishment of the combustible free zone would remove approximately 2.281 acres of old field vegetation and less than 0.1 acres of floodplain forest vegetation (trees and shrubs). Following the initial clearing of existing vegetation and removal of any tree or shrub stumps, a less-flammable mixture of low-growing, cool-season grasses would be planted and

maintained within the project area. These adverse effects would be localized and minor in extent, but long-term in nature (over the life-cycle of the EOD facility).

Weedy herbaceous vegetation, seeds buried in the seed bank, and seedlings of light seeded tree species such as cottonwoods could be expected to re-establish within the combustible free zone during the first growing season following the initial removal of vegetation. Vegetation growth within the combustible free zone would be maintained to a height of no more than six inches by routine mowing.

Mitigation Measures

The use of appropriate erosion control practices would be required to prevent sediment transport out of the combustible free zone into adjacent floodplain forest habitat. These practices would minimize the potential for any off-site adverse impacts to vegetation or water. The appropriate type of land clearing equipment would be used to minimize the disturbance of soil. Any bare soil resulting from the construction activities would be restored with a mixture of cool-season grass seed. Should herbicides be used to control vegetation within or near areas designated as sensitive such as wetlands (see Section 3.2.4) or potential habitat for rare species (see Section 3.2.3) prior coordination with the base natural resources manager is required (WPAFB 2007). In addition, any herbicide use would conform to all base Integrated Pest Management (IPM) practices and herbicide labeling standards for mixing and application to minimize the potential for adverse impacts to off-site vegetation.

To minimize the potential for adverse impacts to vegetation from wildfires, any flammable combustible materials such as duff, leaf litter and dried grass would be raked or manually removed from the 200 foot combustible free zone as necessary before commencement of EOD operations. The WPAFB Fire Department will be on stand-by and available for assistance with extinguishing any spot fires or ignitions that occur as a result of EOD operations. In addition, EOD personnel will coordinate with the WPAFB Fire Department to identify wildfire hazards and appropriate restrictions on detonation operations on days with elevated wildfire risks (“red flag days”) such as low relative humidity, low fuel moistures, high ambient temperatures, and high windspeeds.

4.2.1.3 Alternative 2: Hebble Creek Road Site

Potential Environmental Effects

Minor adverse impacts to vegetation are expected under this alternative. Preparing the site for construction of the EOD facility would remove approximately 0.5 acres of existing herbaceous vegetation

at the site. A small number of existing trees on the site would also need to be removed. The 200 foot combustible free zone would be established and maintained to a height of no more than six inches by regular periodic mowing of the existing herbaceous vegetation. Periodic mowing would have little or no impact on the current composition or quality of the old field community, provided that any heavy equipment used for mowing is not operated when the soils on the site are excessively wet.

Mitigation Measures

Any bare soil resulting from the construction activities would be restored with a mixture of cool-season grass seed. Should herbicides be used to control vegetation, prior coordination with the base natural resources manager is required (WPAFB 2007). As with Alternative 1, any flammable combustible materials such as duff, leaf litter and dried grass would be raked or manually removed from the 200 foot combustible free zone as necessary before commencement of EOD operations. Advance coordination would be also undertaken with the WPAFB Fire Department to minimize the potential for adverse impacts to vegetation from wildfires and identify red flag conditions prior to commencement of any training or EOD operations at the site.

4.2.1.4 Alternative 3: Sandhill Location

Potential Environmental Effects

The existing vegetation in the proposed project area would be disturbed during site preparation and construction activities. As with Alternative 1, these adverse impacts would be localized, but long-term in nature (over the life-cycle of the EOD facility).

A total of 2.673 acres of mixed shrub-grassland upland vegetation would be removed during establishment of the combustible free zone and construction of the EOD facility (about 0.5 acres for preparation of ground for the EOD facility). Following the initial clearing of the existing upland vegetation and removal of any tree or shrub stumps, a less-flammable mixture of low-growing, cool-season grasses would be planted and maintained within the upland portions of the project area.

Establishment of the 200 foot combustible free zone would also require disturbance of 0.208 acres of palustrine emergent wetland vegetation. To the extent possible, this would be accomplished by mowing without removal or conversion of the existing herbaceous wetland vegetation. Shrubs and trees within the area of Wetland C-24 impacted by the combustible free zone would be regularly cut as necessary to remove above ground stems, but the wetland soil profile would not otherwise be disturbed to remove

vegetation. Routine cutting of this woody vegetation would slightly reduce the structural diversity across about nine percent of the total area of Wetland C24, but should not significantly alter the current hydrology or degrade the function of the existing vegetative communities. A regulatory permit and mitigation may be required from the OEPA should it later be determined necessary to convert the existing wetland vegetation to a less-flammable mixture of cool season grasses or physically disturb the soil profile to remove roots and stumps of trees or woody shrubs present in the combustible free zone.

Weedy herbaceous vegetation, species present in the buried seed bank, light seeded tree species such as cottonwoods, and adventive or invasive woody species such as mulberry, bush honeysuckle, and common buckthorn could be expected to re-establish within the combustible free zone in both the upland and wetland environments during the first growing season following the initial removal or mowing of vegetation. Vegetation growth within the combustible free zone in both the upland and wetland environments would be maintained to a height of no more than six inches by routine mowing.

Mitigation Measures

The use of appropriate erosion control practices would be required to prevent sediment transport out of the combustible free zone into adjacent upland and wetland habitats. These practices would minimize the potential for any off-site adverse impacts to vegetation. The appropriate type of land clearing equipment would be used to minimize the disturbance or compaction of soils, particularly within Wetland C24. Any bare soil resulting from the construction activities would be restored with a mixture of cool-season grass seed. Should herbicides be used to control vegetation within or near areas designated as sensitive such as wetlands (see Section 3.2.4) or potential habitat for rare species (see Section 3.2.3) prior coordination with the base natural resources manager is required (WPAFB 2007). In addition, any herbicide use would conform to all base Integrated Pest Management (IPM) practices and herbicide labeling standards for mixing and application to minimize the potential for adverse impacts to off-site vegetation.

As with Alternatives 1 and 2, any flammable combustible materials such as duff, leaf litter and dried grass would be raked or manually removed from the 200 foot combustible free zone as necessary before commencement of EOD operations. Advance coordination would be also undertaken with the WPAFB Fire Department to minimize the potential for adverse impacts to vegetation from wildfires and identify red flag conditions prior to commencement of any training or EOD operations at the site.

4.2.1.5 No Action Alternative

The no action alternative would not result in adverse impacts on the vegetation resources at WPAFB. Positive impacts would include the continued maturation of the old field and floodplain forest communities at the former EOD site (Alternative 1) and the continued process of ecological recovery in Wetland C24 at the Sandhill Location site (Alternative 3). Ecological restoration efforts would also continue with the portions of the Huffman Prairie within the Skeel Avenue site (Proposed Action).

4.2.2 Wildlife

This section describes the potential environmental effects of each alternative on wildlife resources. This analysis is segregated into two parts: 1) impacts that could be expected from construction and maintenance of the EOD facility, 200 foot combustible free zone, and 500 foot clear zone, and 2) noise impacts that could be expected from operation and training at the EOD facility.

In general, animals respond to human disturbances in one of three basic reactions: 1) attraction, 2) habituation, or 3) avoidance (Whittaker and Knight 1998). Habituation is a waning of response to repeated, neutral stimuli and most wildlife, particularly in urban or suburban environments, are capable of becoming habituated to disturbances that do not involve an adverse stimulus (e.g., pain) or adverse consequences. Many large mammals have been known to alter their movements for up to one to two days after exposure to noisy human disturbances, but generally show flexibility in habitat use particularly when the disturbance occurs on a regular schedule (Bowles 1995). However, more secretive species such as black bears have been shown to generally avoid bivouac sites and developed areas on military training ranges, even when soldiers are not present or actively training (Telesco and van Manen 2006). Sensitization (an increased response to stimuli) can often occur in habituated animals with a change in the nature or magnitude of a disturbance (Whittaker and Knight 1998); as such, wildlife responses to humans depend on context and cannot simply be classified as “habituated versus non-habituated”.

4.2.2.1 Construction Impacts

Proposed Action: Skeel Avenue Site

Adverse impacts to wildlife could be expected under this alternative. Similar to Section 4.2.1.1, the extent and duration of these impacts would depend on the amount of disturbance of existing tallgrass prairie habitat required for establishment of the 200 foot combustible free zone and the 500 foot clear zone. Approximately 2.879 acres of existing wildlife habitat will be eliminated or modified under this

alternative for construction of the EOD facility and establishment of the 200 foot combustible free zone. This includes about 0.5 acres of prairie habitat that would be removed for site preparation and construction of the proposed EOD facility.

The proposal to mow the entire 500 foot clear zone, as described in Section 4.2.1.1, is unique to the Proposed Action as it will result in the isolation of small areas of the tallgrass prairie which will be difficult to maintain. Mowing the entire 500' area will allow for more effective management at this location, but would effectively remove 16.163 acres of existing tallgrass prairie habitat (or up to 18.401 acres if the isolated fragments described in Section 4.2.1.1 are also mowed). These impacts would be long-term (over the life cycle of the EOD facility).

All of the direct impacts to wildlife habitat would occur within Burn Unit 1 of the Huffman Prairie (see Figure 3.2.1.1). It is assumed that the remaining wildlife habitat within the burn unit would continue to be managed in accordance with the INRMP (2007) and Huffman Prairie Assessment and Workplan (AMEC 2007). The INRMP will be amended to incorporate mitigation measures required to minimize impact to species potentially displaced by development of the EOD range at this location.

Noise and human presence from site preparation and construction activities associated with the EOD facility would likely result in the temporary displacement of wildlife species in the habitats contiguous to the project area. However, the creation and maintenance of the 200 foot combustible free zone would also introduce an indirect fragmentation effect into the surrounding wildlife habitats in the northern portions of the Huffman Prairie. In addition to directly reducing the amount of wildlife habitat potentially available for nesting, breeding, foraging, and other critical life-cycle activities, modification (routine mowing to a height of six inches) of the existing tallgrass prairie habitat would increase the total amount of edge habitat and reduce the amount of core habitat within the remaining portions of Huffman Prairie.

Mowing the entire 500 foot clear zone would reduce the overall size of the wildlife habitat in the Huffman Prairie by about 13 percent (or about 15 percent if the isolated fragments are also mowed). Frequent mowing could also encourage the further spread of invasive plant species such as common teasel and canada thistle (*Cirsium arvense*) into adjacent areas of remaining prairie habitat.

Establishing additional acreage of tallgrass prairie habitat are expected to mitigate the extent of these effects on wildlife, although at least some short term adverse impacts would be anticipated until the prairie restorations are sufficiently established (generally 3 to 5 years). The proposed mitigation will be most successful if the plantings are contiguous to the remaining prairie habitats or of sufficient size to

buffer against deleterious edge effects. In general, non-contiguous prairie restorations to benefit grassland birds should be at least 50 acres in size, minimize the amount of linear edge, and be located in an area that is at least 100 yards from forested areas, yards, and developed areas that attract predators (Herkert and others 1993). Planting the restorations contiguous to or within close proximity to the existing Huffman Prairie will also increase the likelihood of colonization of the new habitat patches by prairie Lepidoptera species.

Impacts associated with construction of the EOD range are expected to be minor and short term assuming that additional prairie vegetation is established as a mitigation measure in areas contiguous to the prairie. When mitigated by adding additional acreage of habitat, wildlife species dislocated by construction and maintenance activities will re-establish in adjacent available habitat. Wildlife is relatively habituated to human activity within the base as a whole and construction is not expected to result in long term avoidance of the area adjacent to the range.

Alternative 1: Former EOD Site

Minor adverse impacts to wildlife could be expected under this alternative. Approximately 2.361 acres of existing wildlife habitat (2.261 acres of old field and less than 0.1 acres of floodplain forest) will be eliminated under this alternative for site preparation, construction of the EOD facility, and establishment of the 200 foot combustible free zone. This impact will be long-term (over the life cycle of the EOD facility), but is not expected to be significant due to the abundance of old field habitats in other parts of WPAFB. Clearing of less than 0.1 acre of marginal quality forest habitat will not fragment the contiguous floodplain forest habitat present along the Mad River riparian corridor (located immediately west of the proposed facility location) because most of the wildlife habitat fronting Riverview Road is already dominated by edge effects. Minor positive benefits would occur from the removal and control of invasive shrubs and herbaceous plants currently present within the project area. It is assumed that the existing low-quality grassland habitat east of Riverview Road will not be disturbed by construction activities or EOD operations and provides ample suitable habitat for re-location/re-establishment of wildlife species.

Noise and human presence during construction activities will likely result in minor, temporary displacement of wildlife species in the habitats contiguous to the project area, however this effect would be short term and relatively insignificant, as wildlife species in the vicinity are likely already conditioned to the presence of humans and military operations.

Establishing a low-growing, less combustible ground cover of cool-season grasses within the combustible free zone would partially offset the adverse impacts associated with the clearing of vegetation and removal of existing wildlife habitats during construction of the EOD facility. However, these measures would likely benefit habitat generalists (such as white-tailed deer) that are already abundant in the area and the routine mowing of the vegetation would limit the potential use of the area for ground-nesting birds. In addition, due to the proximity of the site to the active airfield, appropriate management measures would be required under this alternative to limit the potential for future bird-airstrike hazards (BASH). Details of the BASH plan are contained in the INRMP (WPAFB 2007).

The use of BMPs for erosion control to protect vegetation resources (see Section 4.2.1) will minimize the potential for off-site, adverse impact to adjacent wildlife habitats during construction and operation of the facility.

Alternative 2: Hebble Creek Road Site

Minor adverse impacts to wildlife could be expected under this alternative. Less than 0.5 acres of existing habitat would be eliminated under this alternative for construction of the EOD facility. This impact will be long-term (over the life cycle of the EOD facility), but is not expected to be significant due to the abundance of such habitat in other parts of WPAFB. It is assumed that regular mowing within the 200 foot combustible free zone would not significantly change the composition of the existing vegetation and wildlife habitat, as the field encompassing the proposed EOD facility for this alternative is already mowed on a one to three year cycle.

Noise and human presence from construction activities will likely result in minor, temporary displacement of wildlife species in the habitats contiguous to the project area. This effect should be short term and relatively insignificant, as wildlife species in the vicinity are likely already conditioned to the presence of humans and military operations.

Alternative 3: Sandhill Location

Minor adverse impacts to wildlife could be expected under this alternative. Approximately 2.879 acres of existing wildlife habitat will be eliminated or modified under this alternative for construction of the EOD facility and establishment of the 200 foot combustible free zone. This includes 2.673 acres of shrubby upland habitat and 0.208 acres of palustrine emergent wetland habitat. This impact will be long-term (over the life cycle of the EOD facility).

Minor localized adverse impacts from fragmentation of surrounding wildlife habitats can be expected from this alternative, as the proposed location for the EOD facility is currently located in a remote area of WPAFB that is currently isolated from hard-surface roads and recurrent human activities. Noise and human presence from construction activities would likely result in temporary displacement of wildlife species in the habitats contiguous to the project area. This effect could be of moderate significance as some wildlife species in the Sandhill Location area may not be well habituated to military ground operations. In addition, the creation of additional edge habitat within the Sandhill Location area will likely result in a slight increase in nest predation and parasitism for migratory songbirds that roost in the habitats contiguous to the proposed EOD facility. Minor positive benefits for surrounding wildlife habitat would occur from the removal and control of invasive shrubs and herbaceous plants currently present within the project area.

As in Alternative 1, measures to control soil erosion during construction and operation of the EOD facility would minimize the potential for any adverse impacts to adjacent upland and wetland habitats (See Sections 4.2.1 and 4.2.4).

No Action Alternative

No effects on wildlife are expected under this alternative.

4.2.2.2 Operational Impacts

The following review of the potential impacts on wildlife from operation of the EOD facility is broken down into two parts: 1) impacts from the increased human presence in wildlife habitats and 2) impacts of explosive noise. This analysis is applicable to all four alternative site locations unless otherwise noted.

The reaction of wildlife to human activity and noise disturbances is likely to be species specific. Habitat generalists such as those species listed in Section 3.2.2 tend to show little overall reaction to the increased presence of vehicles or military personnel. However, the recurring nature of the proposed training may limit the suitability of habitats immediately adjacent to the proposed facility for breeding bird species such as raptors that are generally less tolerant of pedestrian human disturbances (Richardson and Miller 1997). The magnitude of these effects on wildlife are not expected to be significant given that most species are likely habituated to the generally noisy environment of the base and abundant suitable habitat for wildlife exists on other parts of WPAFB and surrounding areas.

Although vehicular traffic and the presence of EOD personnel may temporarily displace wildlife from the immediate vicinity of the EOD range. Most of the potential impacts to wildlife from the proposed EOD operations relate to the effects of explosive noise. Operations at the range may be as frequent as 3 days per week for up to 8 hours per day with approximately 1 detonation per hour during operation. The actual training schedule however, is expected to be far less frequent with an estimated once per week operation with a single detonation per week. While not an exhaustive literature search, the studies listed in Table 4.2.2-1 demonstrate that habituation of an individual to noise generally shows an inverse relationship to the frequency of occurrence and magnitude of a noise event. In addition, induced reactions of nesting birds to military noise (such as startle responses and flushing from nests) have been shown to vary significantly with the progression of the breeding season, suggesting that some species may not show overt responses to noise at all times of the year (Palmer and others 2003, Delaney and others 1999, Grubb and Bowerman 1997).

The projected 136 dB contour for each alternative location represents a rough estimate of the highest noise zone from EOD operations. For each alternative, this would result in approximately 115 acres of grounds outside the center of the EOD facility (to include the clear zone) that would become potentially less suitable for wildlife habitat. Although long-term in nature (over the life-span of the EOD facility), it is not anticipated that population level changes for wildlife will be adversely affected under Alternative 1 (Former EOD Site), Alternative 2 (Hebble Creek Site), or Alternative 3 (Sandhill Location) due to the abundance of similar suitable habitats present at WPAFB.

It is more difficult to quantify the impacts of blast noise on wildlife (particularly grassland birds) under the Proposed Action (Skeel Avenue Site) due to the unique nature of the tallgrass prairie habitat at WPAFB. Published data also are not available to evaluate the specific impacts of blast noise on tallgrass prairie obligates such as the sedge wren or bobolink (which have been previously documented in the Huffman Prairie). Some habituation of wildlife to high noise environments has probably already occurred for those species currently utilizing Huffman Prairie due to the proximity of the prairie habitat to the active airfield. However, additional negative behavioral responses to blast noise such as those described above and in Table 4.2.2.2 (e.g., startling/flushing from nests, increased stress, habitat avoidance) could be expected under this Alternative.

It is also likely that some grassland birds may choose not to utilize areas of remaining habitat within the Huffman Prairie impacted by high noise levels. As discussed in Section 3.2.2.1, the 136 dB contour would encompass up to 27.5 percent of the Huffman Prairie Natural Landmark and about 33 percent of

the total available habitat within the Huffman Prairie as a whole. Suitable tallgrass prairie habitat is expected to be created on the base to mitigate the loss of prairie area should the Skeel Avenue Site be selected for the Proposed Action.

Additionally, variables such as temperature of the atmosphere, wind speed, wind direction, cloud cover, and relative humidity can cause significant changes (as much as 50 dB) in received sound levels from a distant noise source (Pater and others in press). Scheduling of detonation events during favorable conditions may significantly reduce potential adverse wildlife responses. Finally, the projected noise contours are based on the maximum allowed charge use (5 lbs of high explosives) and do not characterize noise propagation from smaller charges or thermite grenades that may be used for EOD training. It is assumed that noise levels from smaller charges will be significantly less than the projected worst case scenario.

Mitigation of the tallgrass prairies as described elsewhere in this EA and operational controls are expected to provide additional habitat and attenuate potential noise, thereby reducing the potential adverse impact on area wildlife resources in the area to a moderate level. The INRMP will be amended to reflect the mitigation measures applicable to minimizing the effect on these species.

The infrequent nature of activity at the range will continue to cause a startle reaction in many species at each of the 4 proposed locations, but long-term displacement is not expected due to the presence of other suitable habitat in the vicinity of each of the alternative location and the current state of habituation to noise across the base environment. There are no anticipated effects on wildlife from explosive noise under the no action alternative.

Table 4.2.2.2 Summary of recent research on effects of blast noise on select wildlife species.

Author(s)	Species Under Study/Location	Type of Noise	Effect
Anderson and others (1986) Anderson and Rongstad (1989)	Red-tailed hawk (<i>Buteo jamaicensis</i>)/U.S. Army Pinyon Canyon Maneuver Site and Ft. Carson Military Reservation, Colorado	Tank maneuvering and firing, low-level helicopter flights 30-45 m above nest sites	Red-tailed hawks moved away from tank training areas during the nesting season (avoidance); Flush response to helicopters; red-tailed hawks at Pinyon Canyon not previously exposed to helicopters exhibited stronger avoidance behavior to overflights than habituated hawks on Ft. Carson
Conomy and others (1998)	Black duck (<i>Anas rubripes</i>) and wood duck (<i>Aix sponsa</i>)/Piney Island military aircraft target range, North Carolina	Low-level military aircraft overflights and maneuvers	Black ducks habituated rapidly to military noise; wood ducks did not habituate as rapidly and continued to show reactions to noise through study period
Delaney and others (2002)	Red-cockaded woodpecker (<i>Picoides borealis</i>)/Ft. Stewart Georgia	Helicopters, fixed wing aircraft, large-caliber weapons fire (artillery), missiles, artillery/grenade simulators, military & civilian vehicles (dose response model developed for .50 cal and artillery simulators)	Flush response; unweighted noise levels were significantly louder than woodpecker weighted noise levels; RCWs flushed from nests when large caliber weapons fire was 500-600 m from nests, but did not flush when such guns were fired >700 m from nests and SEL noise levels <102 dB (59 dB woodpecker weighted); RCW did not flush when artillery/grenade simulators were detonated >200 m from nests and SEL noise levels were <82 dB (47 dB woodpecker weighted); short duration (< 2hours) military training did not significantly reduce RCW fitness rates where habitat quality was not a limiting factor
Delaney and others (1999)	Mexican spotted owl (<i>Strix occidentalis lucida</i>)/Lincoln National Forest, New Mexico	Military helicopter overflights and chain saw noise (dose response model developed)	Flush response; authors developed "owl-weighted" noise model based on owl hearing frequency; owls did not flush when SEL sound level for helicopters was below 102 dB (owl weighted) or 92 dbA; for chainsaws, no flush response below 59 dB (owl weighted) or 46 dbA; flush response increased with decreasing distance to source and increasing progression into the nesting season
Doresky and others (2001)	Red-cockaded woodpecker/Ft.	Artillery fire, small arms fire,	Patterns of weapons firing of short-duration, followed by periods of no

Author(s)	Species Under Study/Location	Type of Noise	Effect
	Benning Georgia	unspecified aircraft, vehicles	firing did not appear to have a significant effect on the overall reproductive success of the installation RCW population; most re-nesting occurred in treatment clusters and nest failures appear to be associated with groups of RCWs that had not been previously exposed to training noise
Grubb and Bowerman (1997)	Bald eagle(<i>Haliaeetus leucocephalus</i>), central Arizona and lower peninsula of Michigan	Aircraft overflights, to include fixed wing and jet aircraft (civilian and military)	Flush responses; helicopters elicited the greatest frequency of response (47%), followed by jets (31%) and light planes (26%); frequency of flush responses increased as the nesting season progressed and adult nest attendance requirements decreased; response rates of eagles decreased as distances to the noise source increased and frequency of air traffic increased (habituation effect)
Krausman and others (2004)	Sonoran pronghorn (<i>Antilocarpa americana sonoriensis</i>)/USAF Barry M. Goldwater Range, Arizona	Military overflights, non-military overflights, ground activities with vehicles and people, ambient noise levels up to 123 dB	No detectable differences between control and treatment population responses to military noise stimuli; differences in amount of foraging and travelling between treatment and control populations appear related to differences in habitat quality; pronghorn in higher quality habitats less inclined to responds to noise stimuli of military overflight (habituation effect); ungulate noise weighting filter developed for overflights of A-10 and F-16 aircraft found that desert ungulates do not hear these aircraft sounds as well as humans (18 dB difference from A-weighted scale).
Palmer and others (2003)	Peregrine falcon (<i>Falco peregrinus</i>)/Eielson AFB military training route, Alaska	Low-level jet overflights; noise level > 85dBA	Differences in nest attendance differed depending on season and sex (males less attentive); no difference in nest attendance for females during incubation/brooding, avoidance response for both sexes late in nesting season

Author(s)	Species Under Study/Location	Type of Noise	Effect
Holthuijzen and others (1990)	Prairie falcon (<i>Falco mexicanus</i>)/Snake River Birds of Prey Area (SRBPA), Idaho	Daytime blasting noise, tests at 136dB and 139dB (averages), 3 times per day over a 3 hour interval for 35 days, distance of 127 m from nests	Temporary flush response of up to 15-30 minutes; no effects on productivity (success rate of incubation and brooding); pairs in remote area not previously exposed to blast noise responded more frequently than pairs already exposed to human activities (habituation effect)
Schuek and others (2001)	Northern harriers (<i>Circus cyaneus</i>), buteonine hawks and eagles, falcons/Orchard Training Area-SRBPA, Idaho	Tank training, small arms firing ranges, mortar/missile ranges	Raptors were most responsive to training that involved firing of ammunition (avoidance response) versus non-firing tank training or convoys; prey availability appears to affect raptor response to training (avoidance of active ranges during periods of low prey and high-intensity training); species-specific responses to training (N. harriers did not alter ground-nesting behavior b/c of training)
Stalmaster and Kaiser (1997)	Bald eagle /Ft. Lewis Army Reservation, Washington	Various small and heavy arms (artillery, mortars) weapons fire, helicopters, boats, explosive ordnance disposal	Flushing response; eagles appeared to habituate to distant noise events that re-occurred in a consistent pattern; but consistently responded to boats, helicopters and EOD within 1.0 to 1.5 km; EOD events had most infrequent and loudest reports; buffer zone of 2km set up from EOD activities to nearest eagle habitat and restricted during first 5 hours of daylight (morning feeding time)
Telesco and van Manen (2006)	Black bears (<i>Ursus americanus</i>)/USMC Camp Lejeune, North Carolina	Unspecified large and small caliber weapons firing and military training (C-weighted noise scale used)	Military training that did not significantly modify highly quality habitat did not appear to modify behavior for older bears; habituation to weapons firing was less for younger bears than older bears; bears tended to avoid firing positions, which had the highest noise levels and less favorable habitat

4.2.3 Threatened and Endangered species

This section addresses the potential impacts of the project alternatives on the Indiana bat, clubshell mussel, bald eagle, and blazing star stem borer. Potential effects of the project alternatives on the eastern massasauga rattlesnake, a federal candidate species, are also evaluated in accordance with conservation

provisions contained in the INRMP (WPAFB 2007). Potential effects of the project alternatives on the sedge wren were evaluated for only the Proposed Action (Skeel Avenue) because of the limited possible distribution of the species at WPAFB. Similar to the Section 4.2.2, this analysis is segregated into construction impacts and operation impacts, as appropriate for each species.

Several other species were reviewed for this project, but are not considered in detail because known populations occur outside the proposed project areas and will not be affected by construction or operation of the EOD facility. These include the Great Plains ladies tresses, lesser ladies tresses, Crawe's sedge (*Carex crawei*), whorled water millefoil (*Myriophyllum verticillatum*), and western false gromwell (*Onosmodium molle* var. *hispidissimum*).

4.2.3.1 Indiana Bat

Construction Impacts

Proposed Action: Skeel Avenue Site

No suitable habitat for the Indiana bat has been identified within the 200 foot combustible free zone or 500 foot clear zone (see Figure 3.2.3-1d). Therefore, no impacts to Indiana bats are expected from construction of the project.

Alternative 1: Former EOD Site

No adverse impacts to the Indiana bat would be expected under this alternative. Less than 0.1 acres of floodplain forest habitat would be eliminated in the extreme western part of the project area for establishment of the 200 foot combustible free zone. This area has not been identified as suitable habitat for the Indiana bat (See Figure 3.2.3.2a) and is only of marginal quality for the Indiana bat due to the degraded conditions of the vegetation, small size of the trees and generally dense understory and mid-story layers. However, the habitat is located along the Mad River riparian corridor, which provides highly suitable foraging and summer roosting habitat for the Indiana bat. Clearing of the old field vegetation or less than 0.1 acre of floodplain forest habitat is not likely to adversely affect the viability of the population of Indiana bats at WPAFB or fragment the large area of highly suitable habitat located to the west of the project area.

The USFWS has recommended that clearing of live and dead trees within the combustible free zone be minimized to reduce the potential impact on the Indiana bats (USFWS 2009). Based on a site visit conducted by USFWS personnel on 7 April 2009 and the determination of effect submitted to the USFWS on 7/2/09 and 8/5/09 respectively, no further consultation for this species was deemed necessary

(Appendix A). The USFWS issued a determination of effect in correspondence date 2 October 2009 which satisfactorily concluded consultation under Section 7 (Appendix A).

To minimize the potential for any disturbances from construction noise or incidental take of roosting Indiana bats, all clearing of vegetation for establishment of the clear zone will be conducted outside the period April 1 to September 30. Consultation procedures with the USFWS detailed in the INRMP will be followed to determine the extent of mitigation that may be required, if any, to compensate for the loss of summer roosting habitat. Any use of herbicides to control vegetation either during construction or periodic maintenance of the clear zone will be coordinated with the WPAFB Natural Resources Manager in accordance with the INRMP to minimize the potential for any effects on off-site vegetation or aquatic resources (WPAFB 2007).

Alternative 2: Hebble Creek Road Site

No suitable habitat for the Indiana bat has been identified within the 200 foot combustible free zone (see Figure 3.2.3.3). Therefore, no impacts to Indiana bats are expected from construction of the project.

Alternative 3: Sandhill Location

No suitable habitat for the Indiana bat has been identified within the 200 foot combustible free zone (see Figure 3.2.3.4). Therefore, no impacts to Indiana bats are expected from construction of the project.

No Action Alternative

No effects to Indiana bats are expected under this alternative.

Operational Impacts

Published research to date has not detected a measurable response in hibernating bats to noise generated by military training ranges (Hohmann personal communication 2008). Studies from Fort Leonard Wood in Missouri (cited in Shapiro and Hohmann 2005) found that Indiana bats did not alter their foraging behavior on training ranges in response to frequent, low-altitude helicopter flights and artillery firing. However, the hearing sensitivity of Indiana bats has not been quantified and dose-response models do not currently exist to evaluate the effects of sounds created by military activities. Shapiro and Hohmann (2005) report that research currently funded by the Army is evaluating the high frequency properties of blast wave patterns that may pose a risk to endangered bats on military installations. When complete, this project expects to produce dose-response functions that can be used to evaluate the effects of heavy artillery fire on endangered bats as well as assess the potential of high-caliber weapons fire to influence

the selection of foraging areas, cause permanent or temporary hearing loss, interfere with echolocation, or disrupt thermoregulatory behavior.

Figures 3.2.3-.1a, 3.2.3.2a, 3.2.3.3b, and 3.2.3.4 show the extent of Indiana bat habitat for each alternative that will be subject to high peak noise levels from the proposed EOD operations. Most of the ultrasound energy associated with blast noise will attenuate rapidly in the atmosphere and will not carry as far as projected by the peak noise contours. Research has shown that bats tend to alter the frequency and intensity of their calls during echolocation to help discriminate between their own sounds and noises of similar frequencies (Schmidt and Joermann 1986). It is not expected that noise from EOD operations would interfere with echolocation or foraging behavior for any of the project alternatives.

4.2.3.2 Clubshell Mussel

Construction Impacts

No aquatic habitats suitable for the clubshell mussel will be impacted by any of the project alternatives. The only known location of suitable habitat for this species on WPAFB is within the banks of the Mad River and well outside the clear zone for Alternative 1. Appropriate erosion control measures will be implemented at the chosen alternative to prevent any off-site transport of sediment from the clear zone.

Operational Impacts

No impacts from noise on the clubshell are expected under any of the alternatives. About 35 acres of clubshell habitat falls inside the projected noise contours for Alternative 1. Although surveys have not detected live clubshell mussels in this segment of the Mad River, WPAFB manages this habitat as being suitable for the species (WPAFB 2007). Sounds generated in air generally do not transmit well into denser media and sound levels attenuate rapidly in water with depth and angle away from vertical orientation (Bowles 1995). In addition, there would likely be some attenuation of the explosive noise by forest vegetation between the Mad River and the proposed location for Alternative 1. The potential noise generated from EOD operations at this site therefore would not be expected to have any measurable effect on aquatic resources or clubshell habitat.

4.2.3.3 Bald Eagle

As described in Section 3.2.3 of this EA, a pair of bald eagles has been identified nesting approximately 1 mile from the nearest alternative under consideration for EOD activities.

To date, no summer nesting or winter roosting habitat for bald eagles has been identified on the base that would be impacted by the proposed construction or operation of the EOD facilities (WPAFB 2007). Any eagle sightings on the base are reported to the WPAFB Natural Resources Manager. In addition, the Natural Resources Manager coordinates with the ODNR and USFWS to monitor the results of annual winter eagle surveys along the Mad River corridor to determine if additional protective measures are required for this species on WPAFB.

The flushing response of bald eagles to human disturbances is somewhat variable and the degree of response depends, in part, whether the individuals have become habituated to the noise and if the noise also includes a visual stimulus (see Table 4.2.3-1). Distance to disturbance appears to be one of the most important variables for bald eagles not habituated to vehicles, with flush rates of 75 percent reported for distances less than 445 meters (Grubb and King 1991). It assumed that bald eagles foraging or perching in the vicinity of WPAFB exhibit at least some habituation to military operations and would not respond as aggressively as individuals in a more undeveloped environment. However, the INRMP contains guidelines for disturbance buffers that will be implemented in the event that bald eagles are observed in any of the proposed project locations.

Construction Impacts

Proposed Action: Skeel Avenue Site

No significant adverse effects to bald eagles are anticipated under this alternative. Noise from the operation of heavy equipment during construction at this proposed location might cause eagles (if present) to flush from their perch sites in areas of suitable habitat. , and if a flush response did occur, the effect would likely be short term in duration and any eagles perching or soaring in the vicinity would likely return to their perches or simply move to other suitable habitat in the area.

The nearest nesting eagles are located more than 1 mile from the Proposed Action, and the FWS and ODNR guidance previously discussed in Section 3.2 of this EA indicates that no impact is expected from equipment operation or other construction activities which are located further than 0.5 mile from a nesting site. Guidance published by the FWS (24 April 2008) reflects the FWS' interpretation of the requirements of the above referenced legislation which prohibits taking or disturbing bald and golden eagles. As defined in the Eagle Protection Act, "taking" includes all manners of pursuing, injuring or killing or disturbing bald or golden eagles. Disturbances, as defined in the Eagle Protection Act include any interferences which may disrupt the normal habits of the eagles.

Activity specific guidelines include buffers around eagle nests designed to prevent the activities from disrupting the eagles' natural habits. The recommended isolation distance for blasting and other loud, intermittent noises is 0.5 miles between the activity and the nest. As the nest is located greater than 1 mile from the nearest proposed EOD location, WPAFB satisfies the voluntary criteria for adequate protection of the eagles.

The USFWS reiterated this guideline in its correspondence dated 22 July 2009 (Appendix A) which recommends seasonal limitations on activities only for sites located within 0.5 miles of an eagle nest. The ODNR similarly provided guidance as an attachment in its e-mail correspondence dated 22 July 2009 (Appendix A) which recommends limiting activities located near eagle nests to at least 0.25 miles. As the nest is located greater than 1 mile from all four of the proposed EOD alternatives, no impacts are expected at either the Proposed Action or the 3 alternative locations.

Under the no action alternative, EOD training would not occur and therefore there would be no effects from EOD operations on bald eagles.

4.2.3.4 Blazing Star Stem Borer

Conservation measures for this species at WPAFB focus on continued management and restoration of the native prairie ecosystem on the base (WPAFB 2007). Currently, the only known location of the blazing star stem borer on WPAFB is within the Huffman Prairie. However, other areas of suitable old field habitat for the host plants of this insect (*Liatris* spp.) are evaluated as they are discovered to minimize risks to this species from mission-related activities.

Since the primary threat to the blazing star stem borer is loss of high-quality native prairie habitats and associated host plants, no operational impacts from any of the alternatives are anticipated for this species. Therefore, only the potential impacts of construction are evaluated in this section.

Proposed Action: Skeel Avenue Site

Adverse impacts to known habitat for the blazing star stem borer are anticipated under this alternative. The magnitude of these impacts would depend on the amount of habitat modification that occurs for establishment of the 200 foot combustible free zone and the 500 foot clear zone (see Figure 3.2.3.1a). Routine mowing of only the 200 foot combustible free zone would eliminate 1.17 acres of blazing star stem borer habitat. However, mowing the entire 500 foot clear zone would eliminate 7.066 acres of habitat for this species. Almost all the blazing star stem borer habitat impacted under this alternative coincides with the boundary of the Huffman Prairie Natural Landmark.

In addition, the duration of these impacts would be contingent upon the time required for successful establishment of compensatory mitigation of suitable tallgrass prairie habitat *and* the period required for species colonization of the proposed prairie restorations. Although successful establishment of tallgrass prairie plantings is generally accepted to take at least three to five years, the amount of time required for habitat colonization by prairie-obligate Lepidoptera species is highly variable and dependent on a number of factors such as species-specific dispersal traits, the floristic quality and size of the restored prairie, and the permeability of the surrounding landscape filter (Summerville and others 2007, 2006). In general, larger habitat blocks will undergo faster colonization and achieve greater stability in prairie moth communities than smaller or more isolated prairie patches. More mature prairie restorations (7-10 years old) will also tend to contain a larger percentage of moth species with endophytic larval stages (such as *Papaipema spp.*) as well as seed- and flower-feeding caterpillars. As discussed in Section 4.2.2.1, the placement of the proposed prairie mitigation sites in close proximity to or contiguous with the Huffman Prairie will generally decrease the time required for successful colonization of the new habitat. The restored habitats could also help buffer the remaining blazing star stem borer habitat within Huffman Prairie from stochastic extinction events and annual variations in moth population levels.

No direct take of the blazing star stem borer is anticipated under this alternative providing that the initial mowing does not destroy eggs that have been laid on host plants. Although more information is needed to determine how high eggs are placed on the stem of the host plant, it is known that eggs are laid on *Liatris* plants in the fall and hatch in the spring around mid-May (Culthrell 1999). The larva then tunnel into the base of the plant and roots for feeding before pupating in the soil around the base of the plant in late summer (early August to mid September). Initially, mowing the project area during June or July at a height of no lower than 6 inches should help reduce the potential for the take of eggs or larva that may be feeding within the plants. While no *Liatris spp.* were observed within the immediate vicinity of the EOD facility during a site inspection on 4 March 2009, the area to be mowed should also be inspected prior to the initial mowing for potential host plants. Any *Liatris* stems observed growing in the project area could then be carefully transplanted to an undisturbed portion of the prairie.

Alternative 1: Former EOD Site

No impacts are anticipated on the blazing star stem borer under this alternative. Suitable old field habitat was not identified within the project area. The existing old field vegetation in the central part of the project area is located on a site that has been highly disturbed by past military operations and restoration activities and no *Liatris* host plants were observed during field observations made on September 5, 2008.

Alternative 2: Hebble Creek Road Site

Minor adverse impacts to a total of 2.88 acres of potentially suitable habitat for the blazing star stem borer are anticipated under this alternative (see Figure 3.2.3.3a). About 0.5 acre of potentially suitable habitat will be lost for construction of the EOD facility. Periodic mowing within the 200 foot combustible free zone will retain the existing vegetative cover, but prevent herbaceous vegetation from growing higher than about 6 inches. This would generally preclude future establishment of *Liatris* host plants or other prairie vegetation on an additional 2.38 acres over the life-cycle of the EOD facility. However, as discussed in Section 3.2.1, the current vegetation on the site is dominated by non-native and weedy species that are already mowed on a frequency of one to three years. This habitat is only marginally suitable for the blazing star stem borer.

No *Liatris* host plants were observed within the project area during field observations made on 4 September 2008. Therefore, no direct or incidental take of the prairie star stem borer is anticipated under this alternative.

Alternative 3: Sandhill Location

Adverse impacts to a total of 1.49 acres of potentially suitable habitat for the blazing star stem borer are anticipated under this alternative. This habitat is located in the northwestern quarter of the project area and includes both the EOD facility and parts of the 200 foot combustible free clear zone (see Figure 3.2.3.4b). About 0.5 acres of habitat would be lost during site preparation and construction of the EOD facility. Conversion of the existing vegetation to a less-flammable mixture of cool season grasses would remove about another 0.99 acres of potentially suitable habitat for this species. Although no *Liatris* host plants were observed in the immediate vicinity of the proposed barricade location on September 5, 2008, scattered occurrences of other prairie community indicator species were observed in the area (see Section 3.2.1.). A complete inspection was not made of the proposed clear zone due to the dense shrub cover, but it appears that this habitat is at least moderately suitable for the blazing star stem borer. These impacts are anticipated to be long term (over the life of the EOD facility) as removal of the existing vegetative cover for the combustible free zone would preclude further development of native prairie vegetation or establishment of suitable host plants for the blazing star stem borer. However, these impacts are not expected to significantly affect the existing population of blazing star stem borers on WPAFB, as the project area is well-removed from the only currently known occurrences of this species at the Huffman Prairie.

No Action Alternative

No adverse impacts to the blazing star stem borer are anticipated under this alternative. Positive impacts would include continued development of prairie vegetation in areas of suitable habitat within the project area for Alternative 3 (Sandhill Location).

4.2.3.5 Eastern Massasauga Rattlesnake

Conservation measures and habitat management for the eastern massasauga rattlesnake at WPAFB currently focus on the Prime BEEF Training Area and Twin Bases Golf Course, the two known locations of suitable habitat on the base. Although historic sightings are limited to these locations, other areas on WPAFB may provide suitable habitat. The ODNr recently funded a multi-year project to re-survey locations historically occupied by the eastern massasauga rattlesnake, including WPAFB. Once this survey is complete, the Natural Resources Manager will coordinate with the ODNr and the USFWS Ohio Field Office to update management strategies as warranted by any new data on the distribution of this species on WPAFB.

To protect other potentially suitable eastern massasauga rattlesnake habitat, WPAFB has developed conservation measures for the Hebble Creek Road Site, Huffman Prairie and old fields that avoid fragmenting suitable habitat and limit disturbances such as mowing, disking, or prescribed burning to times of when this species is less active or in hibernacula (WPAFB 2007). The INRMP contains additional objectives to avoid any impacts to wetlands that would be detrimental to this species. WPAFB also provides an educational program on threatened and endangered species (to include the eastern massasauga) for military personnel and other users of base facilities and grounds.

No known habitat for the eastern massasauga rattlesnake occurs within any of the alternative project areas. However, the USFWS has expressed concerns about the proximity of some of the alternatives to known suitable habitat for this species (USFWS 2009). Consultation between WPAFB and the USFWS on this matter resulted in the issuance of a letter from the USFWS on 13 August 2009, and subsequent amendment dated 2 October 2009 concluding that consultation had been completed and that operational controls designed to protect the eastern massasauga rattlesnake would adequately address concerns of the agency.

Controls include seasonal restrictions on construction and maintenance activities, recommended limitations on mowing depths and limitations on prescribed burns. Details of the voluntary operational measures are included in correspondence dated 2 October 2009 in Appendix A. rattlesnake

Potential noise impacts on known eastern massasauga rattlesnake habitat from EOD operations may occur under only one of the project alternatives. A total of 216.32 acres of suitable habitat for this species are located south of Hebble Creek Road within the projected noise contours for Alternative 2 (see Figure 3.2.3.3b). Approximately 19.24 acres of this habitat fall with the 136 dB contour. The response of snakes to explosive noise has not been thoroughly investigated. Although Bowles, (1995) reports that snakes generally hear poorly, she also notes that many species of reptiles will freeze in response to intense noise. Alert behavior was also reported by Macini and others (1988) for the India browntree snake (*Dendrelaphis tristis*) in response to aircraft overflights. Noise is not currently identified as a threat to this species' survival by the Eastern Massasauga Rattlesnake Management Working Group (Johnson and others 2000).

4.2.3.6 Sedge Wren

The sedge wren has been previously documented at WPAFB only within the Huffman Prairie Natural Landmark. This species was observed to be breeding in Natural Landmark in 1992, but was not detected on the base in subsequent years (BHE 1999). However, suitable habitat for this species is present within the portion of the project area for the Proposed Action (Skeel Avenue Site) that contains appropriate tallgrass prairie vegetation (to include the Huffman Prairie Natural Landmark and restored areas of Huffman Prairie).

Although sedge wrens prefer to nest in sedge meadows, wet meadows, and grassy areas within wetlands, this species may also be found in drier uplands with tall grasses (1-2 meters high), low shrub cover, and low to moderate forb cover (Dechant and others 1998, Herkert and others 1993). Sedge wrens are considered to be moderately sensitive to habitat fragmentation and may utilize prairie patches less than 10 ha (24.7 acres) in size if adequate structural vegetative characteristics are present. However, as a ground-nesting species, the sedge wren is considered to be very sensitive to mowing and fire disturbances during their breeding season of late April to early October (Dechant and others 1998).

If this species is still present at WPAFB, construction impacts of the proposed project alternative on the sedge wren would be similar to those described for grassland birds in Sections 4.2.2.1 and 4.2.2.2. Approximately 2 percent (2.879 acres) of the available habitat for this species would be removed to create the 200 foot combustible free zone and construct the EOD facility. Mowing the entire 500 foot clear zone would reduce the available habitat for the sedge wren in the Huffman Prairie by about 13 percent (or about 15 percent if the isolated fragments are also mowed). While the sedge wren is generally less sensitive to fragmentation than other areas-sensitive species such as Henslow's sparrow, such habitat losses could slightly reduce the density of the resident population in the remaining habitat. Depending on

the quality of available habitat, territorial requirements for breeding pairs of sedge wrens have been shown to vary from approximately 0.5 acres in sedge meadows up to 8.5 acres in recently burned mesic tallgrass prairie (Dechant and others 1998). The operational impacts of blast noise on the sedge wren would also be similar to those that would be experienced by other grassland birds for this project alternative, which could result in an exclusionary effect on a significant portion of the available habitat for this species at WPAFB.

4.2.4 Wetlands

This section describes the potential effects of each project alternative on wetlands. For purposes of the EA, it is assumed that the 200 foot combustible free zone for Alternatives 1(Former EOD Site) and 3 (Sandhill Location) will be established through minor land-clearing /re-vegetation and maintained by mowing once vegetation is re-established. For the Proposed Action (Skeel Avenue Site) and Alternative 2 (Hebble Creek Road Site), it is assumed that the combustible free zone would be established and maintained by regular mowing of the existing herbaceous vegetation alone.

4.2.4.1 Proposed Action: Skeel Avenue Site

No wetlands are present within or in close proximity to the project area (combustible free zone plus EOD facility) that would be affected by this alternative.

4.2.4.2 Alternative 1: Former EOD Site

No wetlands are present within the project area (combustible free zone plus EOD facility) that would be affected by this alternative. However, potentially adverse impacts could occur to wetlands outside the project area as a result of erosion from construction activities. Wetlands C12 and C13– as well as the Mad River - are located down gradient of the site location for the EOD facility.

To minimize the potential for these adverse impacts, WPAFB would need to implement appropriate storm water management and erosion control practices during construction and EOD operation activities. Also any bare soil created during construction activities would be restored by seeding a mixture of cool-season grasses and installing additional erosion control measures as necessary.

4.2.4.3 Alternative 2: Hebble Creek Road Site

No wetlands are present within or in close proximity to the project area (combustible free zone plus EOD facility) that would be affected by this alternative.

4.2.4.4 Alternative 3: Sandhill Location

Minor adverse impacts to wetlands are anticipated under this alternative. Wetland C24 is located approximately 100 feet from the detonation point and could be potentially impacted from soil erosion during construction activities and EOD operations (see Figure 3.2.4.4). In addition, 0.206 acres of Wetland C24 fall within the 200 foot combustible free zone.

Coordination will need to be undertaken with the USACE and OEPA to determine if vegetation management activities within Wetland C24 will require regulatory permits or mitigation under existing Federal and state wetland regulations. As described in Section 4.2.1.4, adverse impacts to Wetland C24 could be minimized by periodically mowing the wetland area inside the combustible free zone to a height of no less than 6 inches without complete removal or conversion of the existing hydrophytic herbaceous vegetation. Any shrubs and trees within the wetland area that are inside the combustible free zone could be regularly cut and treated as necessary to remove above ground stems, but the wetland soil profile would not otherwise need to be disturbed to remove vegetation, stumps, or below ground roots. The timing and equipment used during the vegetation management activities will also need to be conducted in a manner so as to not rut, compact, or excessively disturb the wetland soils in C24.

Any complete removal of the existing wetland vegetation or disturbances of the wetland soils will likely require a Section 404 permit from the USACE and potentially a Section 401 water quality certification from OEPA. In the event that the USACE makes a determination that C24 is not subject to the conditions of a Section 404 permit, the OEPA will take jurisdiction under the Ohio Isolated Wetlands Law and likely require compensatory mitigation for the impacted wetland acreage under OEPA's wetland anti-degradation rules.

The potential for adverse impacts to Wetland C24 from site preparation and construction under this alternative would be minimized by implementing appropriate storm water management and erosion control techniques to prevent down-slope sediment transport. Also any bare soils created during construction activities would be restored by seeding a mixture of cool season grasses.

Any applications of pesticides within or near wetland areas under this alternative would require coordination with the Natural Resources Program Manager in accordance with provisions of the INRMP (WPAFB 2007). In addition, any herbicide use would conform to all base Integrated Pest Management (IPM) practices and herbicide labeling standards for mixing and application to minimize the potential for adverse impacts to off-site vegetation.

4.2.4.5 No Action Alternative

No impacts to wetlands would occur under this alternative.

4.3 WATER RESOURCES

4.3.1 Groundwater

Environmental consequences for the groundwater resource at WPAFB primarily involve the potential of the accumulation of explosive and metals residues in the soil from detonations which may, over time, impact the quality of the underlying groundwater resources. For this impact to groundwater to occur, the residual material from the detonations would have to accumulate to a level such that the infiltration of precipitation through the soil to the groundwater would result in an impact to the quality of the underlying groundwater resource.

Extraction of groundwater is not planned for the operation so withdrawal of groundwater will not impact the availability of the resource.

4.3.1.1 Proposed Action: Skeel Avenue Site

Potential Environmental Effects

As described above in Section 3.3.1.1, the primary potential consequence to the groundwater resource at the Skeel Avenue Site may result from the accumulation over time of explosive residues and metals in the site soil, followed by the leaching of these materials from the soil to the groundwater. While the 5 year time of travel recharge area for the Skeel Avenue is located in close proximity to the detonation point at this location, the potential for impact is low based on the fact that impact is only expected to occur if residue from detonations is allowed to accumulate over many years. Implementation of the housekeeping measures described below will eliminate the source of potential contaminants, thereby mitigating the potential for impact.

Mitigation Measures

Based on available studies as described in Section 3.3.1.1, the depth to groundwater at the Skeel Avenue Site is approximately 5 feet below ground surface. This thickness of unsaturated soil above the water table provides a limited buffer for potential groundwater impact to result from the accumulation of

residual materials in site soils. Mitigation measures to limit the potential for consequences to the groundwater resource at the Skeel Avenue site are summarized below:

- construct a clay liner (greater than 2 feet in thickness) below the detonation area to limit the infiltration of precipitation in the immediate area of the detonations;
- removal of residues and metal from the area after detonations to reduce the likelihood of residues and metals entering the soil and groundwater; and
- conduct periodic soil sampling (annually or once every two years) to assess the level of residuals and metals present in soils.

4.3.1.2 Alternative 1: Former EOD Site

Potential Environmental Effects

As described above in Section 4.3.1, the primary potential consequence to the groundwater resource at the Former EOD site may result from the accumulation over time of explosive residues and metals in site soil, followed by the leaching of these materials from the soil to the groundwater. In addition to potential impacts from proposed EOD operations, a secondary potential of impact from historic contaminants known to be present at the site from disturbance of residue during EOD operations.

Mitigation Measures

Based on available studies as described in Section 3.3.1.2, the depth to groundwater at the Former EOD site is approximately 5 feet below ground surface. This thickness of unsaturated soil above the water table provides a limited buffer for potential groundwater impact to result from the accumulation of residual materials in site soils. Mitigation measures to limit the potential for consequences to the groundwater resource at the Former EOD site are summarized below:

- construct a clay liner (greater than 2 feet in thickness) below the detonation area to limit the infiltration of precipitation in the immediate area of the detonations;
- removal of residues and metal from the area after detonations to reduce the likelihood of residues and metals entering the soil and groundwater; and
- conduct periodic soil sampling (annually or once every two years) to assess the level of residuals and metals present in soils.

4.3.1.3 Alternative 2: Hebble Creek Road Site

Potential Environmental Effects

As described above in Section 4.3.1, the primary potential consequence to the groundwater resource at the Hebble Creek Road Site may result from the accumulation over time of explosive residues and metals in the site soil, followed by the leaching of these materials from the soil to the groundwater.

Mitigation Measures

Based on available studies as described in Section 3.3.1.3, the depth to groundwater at the Hebble Creek Road Site is approximately 5 feet below ground surface. This thickness of unsaturated soil above the water table provides a limited buffer for potential groundwater impact to result from the accumulation of residual materials in site soils. Mitigation measures to limit the potential for consequences to the groundwater resource at the Hebble Creek Road site are summarized below:

- construct a clay liner (greater than 2 feet in thickness) below the detonation area to limit the infiltration of precipitation in the immediate area of the detonations;
- removal of residues and metal from the area after detonations to reduce the likelihood of residues and metals entering the soil and groundwater; and
- conduct periodic soil sampling (annually or once every two years) to assess the level of residuals and metals present in soils.

4.3.1.4 Alternative 3: Sandhill Location

Potential Environmental Effects

As described above in Section 4.3.1, the primary potential consequence to the groundwater resource at the Sandhill site may result from the accumulation over time of explosive residues and metals in the site soil, followed by the leaching of these materials from the soil to the groundwater.

Mitigation Measures

Based on available studies as described in Section 3.3.1.4, the depth to groundwater at the Sandhill site may be as much as 60 feet below ground surface. This thickness of unsaturated soil above the water table provides a buffer for potential groundwater impact to result from the accumulation of residual materials in

site soils. Mitigation measures to limit the potential for consequences to the groundwater resource at the Sandhill site are summarized below:

- construct a clay liner (greater than 2 feet in thickness) below the detonation area to limit the infiltration of precipitation in the immediate area of the detonations;
- removal of residues and metal from the area after detonations to reduce the likelihood of residues and metals entering the soil and groundwater; and
- conduct periodic soil sampling (annually or once every two years) to assess the level of residuals and metals present in soils.

4.3.1.5 No Action Alternative

No impact to groundwater would occur under this alternative.

4.3.2 Surface Water

As discussed in Section 3.2.2, numerous water bodies exist across the installation. Wetlands are described in Section 3.2.4 of this document. In addition, the Mad River flows southwest along the western boundary of the base and numerous tributaries (including Trout Creek and Hebble Creek) and drains direct storm water from the installation to the Mad River. Storm water from precipitation is directed either naturally or through engineered drains.

The following summarizes conditions at each of the four proposed project locations:

4.3.2.1 Proposed Action: Skeel Avenue Site

This proposed location is relatively flat with an approximate elevation of 804 ft MSL across the 500 foot diameter clear zone which would surround the EOD structure. Trout Creek is located approximately 1,741' south-southeast of the proposed location and Hebble Creek is located approximately 1,600' east of the proposed EOD operation. Storm water is expected to travel via sheet flow. Should sufficient flow from rainfall be present, the storm water should flow west-southwest toward Trout Creek and eventually be discharged to the Mad River based on the NPDES Drainage Area Map (WPAFB, June, 2007).

4.3.2.1.1 Potential Environmental Impacts

Construction activities will require little grading, therefore the potential for exposing significant areas of bare soils is low. A slightly increased potential for erosion and transport of solids into the drain leading to Trout Creek is possible, although significant impacts are unlikely.

Residue from detonation of explosives during training exercises will be generated which, over time, may affect quality of surface water run-off from the site.

4.3.2.1.2 Mitigation Measures

During construction, best management practices should be employed to limit erosion and run-off from the area. The slope may require terraces or other velocity dissipation structures to slow run-off water thereby minimizing the opportunity for erosion during rain events.

To reduce the potential of residues generated by detonation activities from impacting storm water run-off from the area, detonations should be conducted during favorable weather conditions which include low winds and no precipitation either during the training activities or shortly thereafter.

A procedure should be established such that any low order detonations would be immediately cleaned-up. Removal of residues and any larger particles would reduce the likelihood of explosive residues and metals from entering the soil and surface water.

4.3.2.2 Alternative 1: Former EOD Site

The former EOD Site is located at an approximate elevation of 795 feet MSL. The project area slopes to an elevation of approximately 790 feet MSL within the 500 foot clear zone around the proposed EOD structure. The proposed project site is located approximately 335 feet east-southeast of the Mad River. Based on ground surface contours in the area, storm water is expected to flow northeast towards the river. A small wetland area is located in the general direction of natural surface water flow and may receive some storm water run-off from the proposed project site.

4.3.2.2.1 Potential Environmental Impacts

Construction activities will require clearing of mature trees, shrubs and brush from this location temporarily exposing bare soils. An increased potential for erosion and transport of solids into the nearby wetlands and the Mad River will occur until vegetation is re-established.

During operation of the EOD facility, detonations may disturb pre-existing contaminants beneath the ground's surface and increase the potential for transport of these contaminants into local water bodies during rain events.

4.3.2.2.2 Mitigation Measures

During construction, best management practices should be employed to limit erosion and run-off from the area. Potential contaminant migration resulting from soil disturbances during operation of the site may be minimized if a clay or other liner is installed prior to constructing the detonation structure. The addition of cohesive low permeability soils topped with sand may protect the underlying soils which contain known contaminants and minimize the potential for transport of the contaminants into local bodies of water.

To reduce the potential of residues generated by detonation activities from impacting storm water run-off from the area, detonations should be conducted during favorable weather conditions which include low winds and no precipitation either during the training activities or shortly thereafter.

A procedure should be established such that residues from low order detonations would be immediately cleaned-up. Removal of residues and any larger particles would reduce the likelihood of explosive residues and metals from entering the soil and surface water.

4.3.2.3 Alternative 2: Hebble Creek Road Site

This proposed location is relatively flat with an approximate elevation of 797 feet MSL across the 500 foot diameter clear zone which would surround the EOD structure. The Trout Creek is located approximately 1725 feet north-northwest of the proposed location and Hebble Creek is located approximately 329 feet south of the proposed EOD operation. Storm water is expected to travel via sheet flow. Should sufficient flow from rainfall be present, the storm water would enter the east – west ditch along Hebble Creek Road and eventually be discharged to the Mad River based on the NPDES Drainage Area Map (WPAFB, June, 2007)

4.3.2.3.1 Potential Environmental Impacts

Construction activities will require little grading, therefore the potential for exposing significant areas of bare soils is low. A slightly increased potential for erosion and transport of solids into the drain leading to Hebble Creek is possible, although significant impacts are unlikely.

Residue from detonation of explosives during training exercises will be generated which, over time, may affect quality of surface water run-off from the site.

4.3.2.3.2 Mitigation Measures

During construction, best management practices should be employed to limit erosion and run-off from the area. The slope may require terraces or other velocity dissipation structures to slow run-off water thereby minimizing the opportunity for erosion during rain events.

To reduce the potential of residues generated by detonation activities from impacting storm water run-off from the area, detonations should be conducted during favorable weather conditions which include low winds and no precipitation either during the training activities or shortly thereafter.

A procedure should be established such that any low order detonations would be immediately cleaned-up. Removal of residues and any larger particles would reduce the likelihood of explosive residues and metals from entering the soil and surface water.

4.3.2.4 Alternative 3: Sandhill Location

As described in Section 3.2.4.1 of this document, a portion of one wetland occurs within the project area (clear zone) and a number of wetlands are located in close proximity to the clear zone for this alternative (see Figure 3.2.4.4). Topographically, Wetland C24 is located downslope of the proposed EOD facility and receives surface flow from the southeast via a small intermittent channel that appears to be fed by a seep or spring (BHE 2005).

4.3.2.4.1 Potential Environmental Impacts

Construction activities will require clearing of shrubs and brush from this location exposing bare soils. An increased potential for erosion and transport of solids into the nearby wetland will occur. The steep slope of the area will increase the potential for significant erosion.

Residue from detonation of explosives during training exercises will be generated which, over time, may affect quality of surface water run-off from the site.

4.3.2.4.2 Mitigation Measures

During construction, best management practices should be employed to limit erosion and run-off from the area. The slope may require terraces or other velocity dissipation structures to slow run-off water thereby minimizing the opportunity for erosion during rain events.

To reduce the potential of residues generated by detonation activities from impacting storm water run-off from the area, detonations should be conducted during favorable weather conditions which include low winds and no precipitation either during the training activities or shortly thereafter.

A procedure should be established such that any low order detonations would be immediately cleaned-up. Removal of residues and any larger particles would reduce the likelihood of explosive residues and metals from entering the soil and surface water.

4.3.2.5 No Action Alternative

No adverse impacts are expected under the No Action Alternative.

4.3.3 Floodplain

WPAFB has coordinated with the Miami Conservancy District (MCD) to confirm that construction of the EOD training facility will not affect the floodplain storage capacity of the Huffman Dam retention basin (letter dated 1 October 2008). The response of MCD is included in Appendix A.

4.3.3.1 Proposed Action: Skeel Avenue Site

MCD did not object to the design of the proposed EOD facility and stated that construction of the barricade at the proposed location for this alternative site would have little or no impact on the retention basin. Although the project would generate some minor storm water runoff, these impacts would be negligible and create no short or long term impacts on flooding at WPAFB. Therefore, no significant impacts to the floodplain of the Mad River are expected under the Proposed Action.

4.3.3.2 Alternative 1: Former EOD Site

MCD did not object to the design of the proposed EOD facility and stated that construction of the barricade at the proposed location for this alternative site would have little or no impact on the retention basin. Although the project would generate some minor storm water runoff, these impacts would be negligible and create no short or long term impacts on flooding at WPAFB. Therefore, no significant impacts to the floodplain of the Mad River are expected under this alternative.

4.3.3.3 Alternative 2: Hebble Creek Road Site

MCD did not object to the design of the proposed EOD facility and stated that construction of the barricade at the proposed location for this alternative site would have little or no impact on the retention basin. Although the project would generate some minor storm water runoff, these impacts would be

negligible and create no short or long term impacts on flooding at WPAFB. Therefore, no significant impacts to the floodplain of the Mad River are expected under this alternative.

4.3.3.4 Alternative 3: Sandhill Location

The Sandhill Location is outside both the 100 year and 200 year floodplain and therefore would have no impacts on the floodplain. Although the project would generate some minor storm water runoff, these impacts would be negligible and create no short or long term impacts on flooding at WPAFB.

4.3.3.5 No Action Alternative

No impacts to the floodplain or flood storage capacity of the flood retention basin are expected under this alternative.

4.4 HAZARDOUS MATERIALS/WASTE

4.4.1 Proposed Action: Skeel Avenue Site

As detailed in Section 3.4.2 of this document, two soil samples were collected from this location during the site review on March 4, 2009. The samples were intended to represent background conditions at this location. There is no known impact at this location. Materials collected from this area during routine housekeeping of the EOD operations should be evaluated periodically for characteristics of hazardous waste, but no pre-existing hazardous waste appears to be present in the area. The residue resulting from EOD activities (primarily RDX and TNT) is not currently considered a regulated hazardous waste. Results of analysis are summarized in Section 3.4 of this EA and are provided in their entirety in Appendix C of this document.

4.4.2 Alternative 1: Former EOD Site

As detailed in Section 3.4.3 of this document, the former EOD site was remediated and closed in accordance with RCRA in 1997. Soils remaining on the site included those which exceed background concentrations for several metals including lead, selenium and silver as well as detectable concentrations of certain Volatile and Semi-Volatile Organic Compounds (VOCs and SVOCs) (Table 4.4.2-1).

Soils left in-place were determined to meet the criteria for closure using an industrial exposure assumption and the OEPA accepted the closure certification provided that future activities at the site are restricted to industrial uses. Currently, no deed restriction is in place which specifically defines acceptable activities in the closed, Former EOD area. The closure and requirement for deed restrictions

should a transfer of property ownership occur were incorporated into the Record of Decision (ROD) signed on 28 September 1998.

A summary of the maximum concentrations of compounds of interest remaining at the site is provided in Section 3.4 of this EA.

4.4.2.1 Potential Environmental Effects

Several compounds, including Arsenic, Lead and Cadmium may occur at the former EOD Site in concentrations exceeding RCRA thresholds for characteristic toxicity. The Toxicity Characteristic Leaching Procedure (TCLP) is the definitive test method to determine characteristically hazardous wastes pursuant to 40 CFR Part 261, however, the EPA supports an estimation technique using total concentrations rather than the TCLP extract.

In this conservative method, the total concentration (in mg/kg) is divided by 20 to approximate the concentration of the constituent in a leachate extract (mg/l). This calculated number is compared directly to the RCRA regulatory limits found in 40 CFR 261.24. If the calculated number exceeds the regulatory limit, a generator of a waste cannot use the data to disprove that the waste is a regulated hazardous waste. In other words, only a TCLP analysis can definitively prove a material is hazardous under 40 CFR 261.24, however, the calculated number derived from a total result is an accepted indicator of the potential leachable concentration of a material in the absence of TCLP results.

The data provided in the closure report for the Former EOD Site includes data that can be assumed may fail the TCLP for the three compounds listed above. Should the EOD operations be sited in this location, it is likely that contaminated materials in the upper soils will be disturbed, being brought to the surface. This allows for the potential of surface water impact from storm water run-off, creation of a regulated hazardous waste during routine site clean-up activities and the potential for the exposure of personnel to airborne contaminants from the historic area of contamination.

4.4.2.2 Mitigation Measures

To minimize the potential disturbance of pre-existing contaminants at the Former EOD Area, a 2-foot clay or other liner overlain by at least a 1-foot layer of sand is recommended in the area of the detonations to protect the underlying soils from disturbance.

In addition, the standard operating procedures should include a protocol for characterizing wastes collected from the area from routine housekeeping after each training event. This protocol should

include, at a minimum, characterization for compounds known to exist in the soils remaining at the site from the historic remediation.

E-mail correspondence with the Ohio Environmental Protection Agency (OEPA) indicates that limitations on grading, excavating and other disturbance of the former EOD range will not apply. The e-mail specifies that "any use of the former EOD property must be in accordance with WPAFB's use restrictions as referenced in Ohio EPA's May 3, 2000 letter to WPAFB titled "Completion of Partial Closure". It appears the use is limited to industrial and residential use is prohibited." EOD training activities are consistent with WPAFB's industrial use for the property.

4.4.3 Alternative 2: Hebble Creek Road Site

As detailed in Section 3.4.4 of this document, two (2) soils samples were collected from this location during the site review on 4 September 2008. The samples were intended to represent background conditions at this location. There is no known impact at this location. Materials collected from this area during routine housekeeping of the EOD operations should be evaluated periodically for characteristics of hazardous waste, but no pre-existing hazardous waste appears to be present in the area. The residue resulting from EOD activities (primarily RDX and TNT) is not currently considered a regulated hazardous waste.

Results of analysis are summarized in Section 3.4 of this EA and are provided in their entirety in Appendix C of this document.

4.4.4 Alternative 3: Sandhill Location

As detailed in Section 3.4.5 of this document, two (2) soils samples were collected from this location during the site review on 4 September 2008. The samples were intended to represent background conditions at this location. There is no known impact at this location. Materials collected from this area during routine housekeeping of the EOD operations should be evaluated periodically for characteristics of hazardous waste, but no pre-existing hazardous waste appears to be present in the area. The residue resulting from EOD activities (primarily RDX and TNT) is not currently considered a regulated hazardous waste.

Results of analysis are summarized in Section 3.4 of this EA and provided in their entirety in Appendix C of this document.

4.4.5 No Action Alternative

There are no residues as a result of No Action alternative, and therefore does not indicate potential negative impacts.

4.5 LAND USE

There will be a small, but unmitigated loss of open space at each of the four alternative locations from the construction of detonation control structure, barricades and access/parking areas.

4.5.1 Proposed Action: Skeel Avenue Site

This location is considered to be un-restricted use by virtue of its absence from the WPAFB Land Use Control Plan (Shaw, 2006). Existing land use for this proposed alternative is described in Section 3.5.1. The proposed use would change the land use from open space to industrial.

4.5.2 Alternative 1: Former EOD Site

The Former EOD site is classified as Land Use category 2 which allows digging, construction and other soil disturbances after approval by CE and the Environmental Management Division. The area is subject to use restriction in accordance with the Land Use Control Plan (Shaw, 2006). The former EOD site is also specifically listed as Industrial Land Use in the ROD dated 1998.

4.5.3 Alternative 2: Hebble Creek Road Site

This location is considered to be un-restricted use by virtue of its absence from the WPAFB Land Use Control Plan (Shaw, 2006). Existing land use for this proposed alternative is described in Section 3.5.3. The proposed use would change the land use from open space to industrial.

4.5.4 Alternative 3: Sandhill Location

This location is considered to be un-restricted use by virtue of its absence from the WPAFB Land Use Control Plan (Shaw, 2006). Existing land use for this proposed alternative is described in Section 3.5.4. The proposed use would change the land use from open space to industrial.

4.5.5 No Action Alternative

No long term or short term effect on land use will be observed if the no action alternative is selected.

4.6 SOILS

This section describes the potential effects of each project alternative on soil resources. For purposes of the environmental impact analysis, it is assumed that the 200 foot combustible free zone will serve as a firebreak and will be established and maintained at Alternative 1 (Former EOD Site) and Alternative 3 (Sandhill Location) by clearing mature trees, brush and unsuitable vegetation, including tree stumps, followed by necessary grading and re-vegetation. Site preparation at Alternative 2 (Hebble Creek Road Site) and the Proposed Action (Skeel Avenue Site) will be conducted primarily through mowing existing vegetation without the need for exposing significant areas of bare soil. It is assumed that the 200 foot combustible free zone, once established, will be maintained by regular mowing of the existing or re-established herbaceous vegetation. Where re-vegetation occurs, native species known to be somewhat resistant to combustion will be selected when possible.

4.6.1 Proposed Action: Skeel Avenue Site

Minor temporary adverse impacts to soil resources are expected under this alternative during construction. Site preparation and construction activities would result in localized disturbances to the existing soil profile at the site. The potential for soil erosion under this alternative would be limited by implementing erosion control measures and by restoring bare soils with seeding of grass. Periodic mowing of the vegetative cover would have little or no impact on soil resources provided that heavy equipment is not operated on the soils when they are excessively wet to reduce the potential of rutting and soil compaction.

4.6.2 Alternative 1: Former EOD Site

Temporary minor impacts to soil resources are expected under this alternative resulting from clearing, grading and construction activities. Weedy herbaceous vegetation, seeds buried in the seed bank, and seedlings of light seeded tree species such as cottonwoods could be expected to re-establish within the 200' combustible free zone during the first growing season. Mowing on a frequent basis (at least twice during the growing season) should control development of these woody species without further soil disruption.

The potential for off-site migration of sediment through water erosion could be minimized through the implementation of appropriate erosion and sediment controls during clearing and construction and by restoring bare soils with seeding of grass as soon as practical after construction.

4.6.3 Alternative 2: Hebble Creek Road Site

Minor temporary adverse impacts to soil resources are expected under this alternative during construction. Site preparation and construction activities would result in localized disturbances to the existing soil profile at the site. The potential for soil erosion under this alternative would be limited by implementing erosion control measures and by restoring bare soils with seeding of grass. Periodic mowing of the vegetative cover would have little or no impact on soil resources provided that heavy equipment is not operated on the soils when they are excessively wet to reduce the potential of rutting and soil compaction.

4.6.4 Alternative 3: Sandhill Location

Minor temporary adverse impacts to soil resources are expected under this alternative. Site preparation and construction activities would result in localized disturbances to the existing soil profile at the site. The potential for soil erosion under this alternative may be controlled by implementing erosion control measures and by restoring bare soils with seeding of grass. The readily erodible soils and additional grading required at this location may make revegetation of the construction site more difficult than the other proposed locations. Periodic mowing of the vegetative cover, once established, would have little or no impact on soil resources provided that heavy equipment is not operated on the soils when they are excessively wet to reduce the potential of rutting and soil compaction.

4.6.5 No Action Alternative

The no action alternative would have no adverse impacts on the soil resources at WPAFB. Positive impacts would include the reduced potential for soil erosion at the former EOD and Sandhill Location sites and continued process of natural soil development at each site.

4.7 CULTURAL RESOURCES

On October 24, 2008 WPAFB sent correspondence (Appendix A) to the Ohio Historic Preservation Office (OHPO) to fulfill the consultation requirements of Section 106 of the National Historic Preservation Act. Subsequently, a second letter was submitted on April 3, 2009 to the OHPO requesting that the Skeel Avenue Site (Proposed Action) also be considered in its consultation along with an assessment and justification of expanding the Areas of Potential Effect (APE) as requested by OHPO in their 20 January 2009 letter (Appendix A).

Through formal consultation with the OHPO, concerns of significant impact to both the Huffman Prairie Flying Field as well as the historic brick quarters located near the preferred alternative and the Hebble

Creek Road locations were identified.. WPAFB has worked with the OHPO to develop satisfactory operational controls to mitigate the concerns raised in letters dated 20 January 2009 and 22 June 2009 respectively. On 22 June 2009, a letter was issued by the OHPO which documented that the Section 106 consultation had been satisfied for the Sandhill and former EOD alternative locations. A Memorandum of Agreement has been drafted to address remaining concerns regarding potential impacts from noise and visual impacts which may occur with the development of an EOD range at the preferred alternative.

Other agencies contacted as a part of the Section 106 consultation include the United States Fish and Wildlife Service, Ohio Department of Natural Resources, National Parks Service, Miami Conservancy District, The Nature Conservancy, the Advisory Council on Historic Preservation, and the National Aviation Heritage Organization. Requests for agency consultation submitted to satisfy Section 106 requirements and the resulting responses are included in Appendix A. Additionally, a summary of agencies contacted and issues/resolution is provided in Appendix A.

In addition to agency consultation, review and comment was solicited from the local population and four individual tribes which had previously requested notification of proposed actions at WPAFB. A copy of the public notice, informal notifications and resulting written comments are provided in Appendix A.

4.7.1 Proposed Action: Skeel Avenue Site

This site is located on the northern boundary of the Huffman Prairie in Area C of WPAFB, just south of the Airfield Hazardous Cargo Pads. There are two historic properties within the APE and one adjacent (Figure 3.7.1d9.1). They are listed as follows with the distance from the point of detonation:

- Approximately 2450 feet to the east is the western boundary of the Brick Quarters Historic District
- Approximately 2450 feet to the southwest is the eastern boundary of the Huffman Prairie Flying Field (HPFF)
- Approximately 3600 feet to the northeast is the southwestern boundary of the Fairfield Air Depot Historic District

The closest historic structure/building is approximately 2450 feet away from the detonation point. Based on results of blast analysis using Blast/FX software (Appendix E), neither structural impacts nor significant building vibrations are expected to any historic building. In addition, there is zero percent

probability of physical injury to visitors of the HPFF or any other personnel outside of the secured fenced-in 500 foot clear zone based on computer modeling conducted by WPAFB.

Depending on where the visitor is located on the HPFF, there is a low to moderate risk of receiving complaints from the detonations based upon the noise predication guidelines established by the Naval Weapons Service Center (Table 3.9-1). There is also a low to moderate risk of receiving complaints from the residents living in the Brick Quarters Historic District as a result of the noise produced from the detonations. With appropriate mitigation measures such as notifications and awareness education of the EOD range operations to the Brick Quarters residents and HPFF visitors, EOD operations at this site are unlikely to adversely affect the setting or historic integrity of the HPFF or any other historic property.

Based on responses to consultation requests described above, the OHPO concluded that significant adverse impacts will occur in relation to the HPFF and the Brick Quarters described above. Cited impacts are primarily the result of noise and vibrations generated by the Proposed Action at this location. To mitigate the concerns of the OHPO and to attenuate the potential effects of the Proposed Action, a Memorandum of Agreement (MOA) has been signed between the OHPO and the USAF which details conditions under which the Proposed Action may proceed at this location with OHPO concurrence. The MOA includes mutually developed specifications for education and awareness outreach in the form of postings and pamphlets available at the HPFF as a means of mitigating the impacts related to the Proposed Action. Annual reporting which documents efforts towards compliance with the conditions of the MOA is included to demonstrate conformance with the agreement. The MOA includes a termination clause as an enforcement mechanism should the conditions not be met within the specified timeline of the MOA. The execution MOA (Appendix A) satisfies the concerns raised by the OHPO and concludes the Section 106 consultation.

4.7.2 Alternative 1: Former EOD Site

This site is located in Area C of WPAFB north of the intersection of Riverview and Symmes Road, approximately 400 feet east of the Mad River. There are two historic properties within the APE and one adjacent. They are listed as follows with the distance from the point of detonation:

- Approximately 900 feet to the west is historic archaeological site 33GR1023, which is eligible for listing on the National Register of Historic Places (NRHP). This site is referred to by nineteenth century mapping and literature as Kneisly Village, which was occupied from the mid-nineteenth century through to the construction of the Huffman Dam, in the early twentieth century.

- Approximately 3000 feet to the southeast is prehistoric archaeological site 33GR918, which is eligible for listing on the NRHP. The interpretation of this site reveals it as a short-term, single-resource Archaic campsite.
- Approximately 3900 feet to the southeast is the western boundary of the HPFF.

Based upon the blast analysis conducted by WPAFB there would be no structural impacts to the archaeological sites. In addition, there is zero percent probability of physical injury to visitors of the HPFF or any other personnel outside of the secured fenced-in 500 foot clear zone. For HPFF visitors, there is a low risk of receiving complaints from the detonations based upon the noise predication guidelines established by the Naval Weapons Service Center (Table 3.9-1). In general, this site has a low potential of significantly disturbing the desired visitor experience at the flying field and does not adversely affect the setting or historic integrity of the HPFF or any other historic property.

4.7.3 Alternative 2: Hebble Creek Road Site

The proposed EOD range at this location is north of Hebble Creek Road and east of Marl Road. There are two historic properties within the APE (Figure 3.7.1b9.3). They are listed as follows with the distance from the point of detonation:

- Approximately 900 feet to the east is the western boundary of the HPFF.
- Approximately 3000 feet to the north is prehistoric archaeological site 33GR918.

Based upon the blast analysis there would be no structural impacts to the archaeological site or HPFF. In addition, there is zero percent probability of physical injury to visitors of the HPFF or any other personnel outside of the secured fenced-in 500 foot clear zone. To minimize the potential for visitor confusion regarding the type of fencing around the EOD range, a different fence, such as chain link fence can be installed around the range.

Depending on where the visitor is located on the HPFF, there is a moderate to high risk of receiving complaints from the detonations based upon the noise predication guidelines established by the Naval Weapons Service Center (Table 3.9-1). All of the HPFF interpretive signs, structures and walking trails are located in the 129 decibel range or the moderate risk level for receiving complaints. This site primarily has a moderate potential of causing increased complaints from visitors of the flying field.

The potential for effects on the visitor's experience is subjective and is based upon the visitor's perception and understanding of HPFF being located on an active military installation and it is difficult to assess the impact to the historic integrity of the HPFF solely based upon visitor experience when the law addresses the effects on historic properties. With the appropriate notifications and awareness education of the EOD range operations to the HPFF visitors, the potential risk for disturbing the visitor experience would be reduced.

The EOD range is a mission essential activity and is another source of noise surrounding the HPFF. Due to the very short duration (less than one second) of the blasts and the frequency of the training operations (at maximum, one blast per hour, three days/week, Monday – Friday), it is likely that the overall visitor experience at the HPFF would not be significantly impacted. According to the National Park Service (NPS) visitation statistics for the ranger-guided tours, the majority of the visits to the HPFF are on the weekends, especially Memorial Day through Labor Day. NPS statistics also indicate that during the months of May, late August, and September the majority of visitors occur during the weekdays, Tuesday and Thursday, in the form of school groups. Coordination between WPAFB and the NPS would be critical to ensure minimal disruption to both EOD operations and NPS activities at the HPFF.

The historic integrity of the HPFF has been maintained for the past several years by WPAFB while coexisting with the following past and present forms of nearby noise generating activities: daily flying of C-5 aircraft, hunting, shotgun skeet range, and operation of the former outdoor Combat Arms Training and Maintenance Range. Effective coordination between EOD operations and the NPS as well as implementation of public education outreach measures, and other operational mitigation measures would significantly reduce the potential risk of visitor complaints to low probability. Mitigation measures include:

- The HPFF is closed every Wednesday to allow full use of the shotgun skeet range, which is located approximately 500 feet southeast of the southwestern boundary of the flying field. One of the three EOD training days could be conducted on Wednesdays which would eliminate the impact to park visitors
- A flag would be flown and signs posted at the EOD range identifying when EOD operations are occurring
- Notifications prior to EOD operations would be made to identified base agencies and the NPS

With appropriate mitigation measures and coordination, it is unlikely that EOD operations at this site would adversely affect the setting or historic integrity of the HPFF or any other historic property.

4.7.4 Alternative 3: Sandhill Location

The proposed EOD range at this location is northeast of State Route 235 (Chambersburg Road) and east of Haddix Road. There are no known historic properties located within or adjacent to the APE.

4.7.5 No Action Alternative

There would be no impact to historic properties should the no action alternative be selected.

4.8 AIR QUALITY

The potential impacts on local air quality posed by construction and operation of the EOD training facility are very similar at each of the four alternative locations. The possible impacts during both construction and operations are discussed below.

4.8.1 Potential Construction Impacts

Initially, the Former EOD Site (Alternative 1) would result in short-term impacts to air quality from construction activities in the form of fugitive dust emissions due to the clearing of vegetation, grading of the site, installation of the EOD containment structure, and construction of an access road and parking lot to service the facility. In accordance with Ohio Administrative Code (OAC) 3745-17-08, Restriction of Fugitive Dust, emissions would need to be controlled with water or other dust suppression chemicals. The duration of construction is expected to be two weeks to one month depending on the amount of tree and shrub clearing required at each alternative location.

The site preparation activities at the Former EOD site may also pose an additional potential for emissions of limited concentrations of contaminants known to be historically present at the site when soils are disturbed. The magnitude of the potential emissions is expected to be small. Degradation to air quality is expected to be minimal during construction activities at each proposed location.

4.8.2 Potential Operational Impacts

During operation of the EOD training facility, it is anticipated that thermite grenades, explosives containing TNT, and C4 will be detonated. Whenever explosives are detonated, gaseous pollutants may be released. As is discussed in Section 1.2, training exercises will be conducted approximately three

times per week. Detonations are limited to 5 lbs net explosive weight (NEW) with eight detonations per training event. While potential to emit calculations must be performed assuming the emissions unit will be operated 365 days per year, emissions calculations were performed first for detonation three days a week for comparison with Ohio EPA “De Minimus” rule OAC 3754-15-05. As is discussed below, this initial calculation showed that this emissions unit cannot be considered “De Minimus” (emissions of less than 10 lbs/day of any air pollutant) and therefore a potential to emit for 365 days per year was not performed.

Calculations were performed using the Environmental Protection Agency (EPA) emissions factors listed in AP-42 Fifth Edition, Volume 1, specifically Chapter 15 which is currently in draft form and is being developed specifically to address military ordnance detonation activities. Emissions were calculated using emissions factors developed by the EPA for five explosive devices meeting the description of thermite grenades, or explosive devices containing TNT or C4. The five explosives analyzed included: Department of Defense Identification Code (DODIC) G900 – Incendiary Grenades, DODIC M030 – ¼ Pound Demolition Block Charge, DODIC M031 – ½ Pound Demolition Block Charge, DODIC M032- 1 Pound Demolition Block Charge, and DODIC M023 – M112 Demolition Block Charge. To determine the maximum daily/annual emissions of all pollutants expected as a result of detonations for each type of explosive device, a daily and annual maximum for each pollutant was calculated assuming 40 lbs NEW detonated each day (5lbs NEW per detonation with 8 detonations per training day). A summary of maximum pollutants was then developed using the maximum concentration of each pollutant over all five explosive devices used in the calculation. The results of calculations can be found in Appendix D.

Results indicate that maximum daily and annual emissions from the detonation will be from carbon dioxide at 60 lbs/day or 9,360 lbs/year. The total annual contribution of all hazardous pollutants and toxic chemicals will be 648 pounds/year. Based on the results from emissions estimates, the pollutants resulting from the detonation of explosives at the EOD facility cannot be considered “De Minimus” under OAC 3754-15-05.

Based on discussion with Chris Clinefelter, Supervisor, Permit Unit Regional Air Pollution Control Agency (RAPCA), a facility such as WPAFB must apply for a permit-to-install and operate (PTIO) and provide a potential to emit calculation prior to installation of this air emissions unit. Under OAC, the review and issuance period can be as lengthy as 180 days, so consideration must be made to determine the appropriate timeframe for submittal of the application. After obtaining the PTIO for installation, the EOD facility will need to be added to the current Title V permit during the next required renewal period. According to OAC Rules, the renewal must be submitted no later than 6 months before the expiration

date. As the current Title V expiration is 17 February 2009, at the time of this report submittal, the renewal application has already been submitted. As such, the emissions unit will likely be added during the renewal period scheduled for 2013. Until the emissions unit is added to the Title V permit, the additional source will be considered an off permit change.

4.8.3 No Action Alternative

For the No Action Alternative, no EOD facility will be constructed or operated and therefore no impact to air quality is expected.

4.9 NOISE

Sound is a waveform that travels through media including air, water and structural materials such as wood and steel. The level of noise impacts are based on the magnitude of one or more of the noise characteristics, namely, sound level (amplitude), frequency (pitch), and duration. The amplitude of a sound wave is equivalent to what we perceive as loudness. Since sound is a compression wave, its loudness or amplitude would correspond to how much the wave is compressed. A common measurement of loudness is the decibel (dB). Frequency is the rate that the maximum compressions pass a given point in a second. The unit of frequency is the hertz (Hz), Audio frequencies are those that are within the human range of hearing (approximately 20 Hz to 20,000 Hz).

Amplitude is further refined by including frequency as a “weighting” factor. An Operational Noise Manual prepared by Operational Noise Program Directorate of Environmental Health Engineering - U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), for DOD facilities, describes A-weighted as the primary descriptor of sounds detected by humans (dBA) which is generally 1,000 to 4,000 Hz range. The manual also describes C-weighting which is used for intense low frequency signals (near or below the threshold of human hearing) such as munitions blasts that tend to create building rattles and vibrations.

An explosion causes a sudden surge in air causing a high-volume sound. The spectra of military explosives usually contain more low frequency sounds as opposed to the confined explosions of guns. The typical spectrum from a 5 lb. charge of plastic explosive (C4) has the most energy at 31 Hz. Since humans detect noises best which are greater than 1000 Hz, these explosions are often not perceived as being relatively loud. Such low frequencies can travel much longer distances than can higher frequency sounds because they are less likely to be absorbed by other materials in their path. This makes very low frequency sounds useful in applications such as low frequency sonar. Low frequency sound waves are

more likely than higher frequency waves to cause vibration in wood and steel structures, such as buildings near an explosion site.

The spectrum of uncontained explosions is related to the size of the explosion in that the larger the explosion, the lower the spectrum. Thus, charges smaller than 5 lbs. have a spectrum peaking at a frequency higher than 31 Hz, and charges larger than 5 lbs. have a spectrum peaking at a frequency lower than 31 Hz. When explosions have a spectral energy below 20 Hz (like those near demolition grounds, bombing ranges, or artillery impact areas) people barely notice an explosion when outdoors but, because of induced vibrations, become intensely aware of the vibrations when they step inside their homes. Based on the above discussions, an adverse noise impact is possible with the potential for structural damage, and annoyance to public.

Some temporary noise can be expected during construction of the EOD facility at each of the four proposed sites. The effect of noise generated during preparation and construction of the site is expected to be minimal and temporary. The majority of potential impacts anticipated at the sites will arise from routine detonation of ordnance. As described in Section 3.9, training activities are expected to occur at a maximum of three days per week for 8 hours per day. Approximately 8 detonations will occur during each training event during times of maximum usage of the range. In practice, training will occur at a much reduced schedule of approximately one day per week with one detonation per week. In general, the training events will occur during daylight hours however the EOD facility may be used occasionally to conduct night-time training activities.

The AICUZ documents that the Proposed Action (Skeel Avenue Site) is located within the 75 dB-A DNL contour and the other Alternative Sites (former EOD Site, Hebble Creek Road Site and the Sandhill Location) are within the 80 dB-A contour. (Figures 3.9.1 – 3.9.43). Data collected by AFCEE in 2008 confirms that the baseline noise conditions resulting from existing activities continues to be consistent with the 1995 AICUZ (FigureFigures 3.9-a, b.1, 3.9.3). A study at the Naval Air Station, Whidbey Island, WA (July 2000) has shown that operation of an EOD facility similar to that proposed at WPAFB may be expected to result in peak noise levels of 129 dB at 3,000 feet from the detonation site and 136 dB at a distance of approximately 1,250 feet from the point of detonation.

Variations of temperature, pressure, humidity and wind velocity will affect the speed of sound travel. For instance, clear skies with billowy cloud formations and conditions of rising barometric pressure are generally considered optimal for conducting activities that may generate significant noise. Conversely,

sustained winds of >5mph , cold, hazy or foggy mornings and days on which there is a significant temperature swing are typically poor conditions for activities such as EOD training.

4.9.1 Proposed Action: Skeel Avenue Site

The Skeel Avenue location for EOD training facility is situated southeast of the southern end of the main runway area and northwest of Skeel Avenue. A 3,000 foot radius at this alternative location encompasses mostly grassy field. From Figure 4.9d it can be observed that the The 3,000 foot radius also includes a small portion of the nearby golf course as well as overlapping with the northwestern boundary of the Brick Quarters Historic District described in Section 3.7. (Figure 4.9.1). Under the AICUZ, this alternative location falls within the 80 dB-A DNL contour, as determined in the 1995 study.

Based on the tables 3.9-1 and 3.9-2 provided in Section 3.9, moderate impacts are possible in the form of potential noise and vibration complaints from residents of the Brick Quarters Historic District. Based on blast calculations conducted by WPAFB engineers (Appendix E) vibrations resulting from detonations of ordnance have been demonstrated to be insufficient to cause structural damage or significant vibration at these residences. Noise resulting from detonation, however, has the potential to impact the quality of life of residents within approximately 3,000 feet of the point of detonation.

The noise impacts can be minimized by implementing the following mitigation measures:

- Coordinate with WPAFB Housing Office to identify effective measures for notifying and promoting awareness of the training activities with nearby residential population. This may involve providing advance notices for detonation activities and other educational outreach designed to promote understanding of the training efforts in order to encourage a positive public perception regarding the occurrence of detonations. To reduce potential for noise complaints, the time and duration of detonations should consider the meteorological conditions that affect the peak noise level, and the noise travel distance. When possible, training should be conducted during daylight hours in conditions which are optimal for noise attenuation.

4.9.2 Alternative 1: Former EOD Site

A 3,000 foot radius at the former EOD site encompasses primarily wooded areas, and extends onto Riverview and Symmes Roads, which are accessible for public use. (Figure 4.9.2). No residential or other populated areas are located within 3,000 feet of the proposed alternative location. Therefore,,

therefore this location poses little potential for noise related disturbances. Additionally, the heavily wooded nature of the surrounding area will likely attenuate noise from operations at the site.

Sudden blast noise may, however, cause a “jolt” reaction to motorists which may result in minor safety considerations. Traffic load on Riverview and Symmes Roads is minimal and the potential for noise related impacts to motorists is low. Additionally, sections of these roads are within the 500’ isolation area required by AFMAN-91-201, therefore, the roads would be closed during EOD operations to satisfy the requirements of the explosives safety rules.. Based on the Tables 3.9-1 and 3.9-2 provided in Section 3.9, minor impacts can be expected. Noise impacts during construction are expected to be minimal.. Figure 4.9a provides an overview of the former EOD site and the surrounding area.

The noise impacts can be minimized by implementing the following mitigation measures:

- To reduce potential for noise complaints, the time and duration of detonations should consider the meteorological conditions that affect the peak noise level, and the noise travel distance. When possible, training should be conducted during daylight hours in conditions which are optimal for noise attenuation.
- A protocol will be required to determine the time, duration and amount of explosives detonations, and communication procedures for relaying information about training events to civilian and Base receptors.
- Public relations may be required to promote awareness, and educate those using the roadways in the vicinity of the EOD range. This may involve providing advance notices for detonation activities.

4.9.3 Alternative 2: Hebble Creek Road Site

The alternative location for EOD training facility is proposed in the Hebble Creek Road Site, which is situated on the southern end of the main runway area. (Figure 4.9.3). A 3,000 feet radius at this alternative location encompasses mostly grassy field. From Figures 3.9.3 and 4.9b9.3 it can be observed that the 3,000 foot radius includes a portion of Huffman Prairie Flying Field as well as the nearby public use golf course. Based on the tables 3.9-1 and 3.9-2 provided in Section 3.9, and results of consultation with the NPS, significant adverse impacts can be expected in this area due to the potential for negatively affecting the experience of visitors to the HPFF. Lesser impacts are expected for users of the golf course.

Consultation with the NPS cites anecdotal reports from visitor surveys that noise is a significant factor in the overall enjoyment of this National Landmark. In consideration of this, the following mitigation measures are recommended to minimize impacts to visitors:

- Providing prior information to the NPS and HPFF visitors of detonation activities.
- To reduce potential for noise complaints, the time and duration of detonations should consider the meteorological conditions that affect the peak noise level, and the noise travel distance. When possible, training should be conducted during daylight hours in conditions which are optimal for noise attenuation.
- Public relations may be required to promote awareness, and educate the nearby residential population. This may involve providing advance notices for detonation activities.

4.9.4 Alternative 3: Sandhill Location

The Sandhill Location is situated at the northern part of the WPAFB boundary. (Figure 4.9.4). This area is located within the APZ I (Figure 3.10) at the northernmost portion of WPAFB. From Figure 4.9c, it can be observed that the 3,000 foot radius at the Sandhill Location includes a nearby off-base residential area. Based on blast calculations conducted by WPAFB engineers (Appendix E) vibrations resulting from detonations of ordnance have been demonstrated to be insufficient to cause structural damage or significant vibration at these residences. Noise resulting from detonation, however, has the potential to impact the quality of life of residents within approximately 3,000 feet of the point of detonation.

The noise impacts can be minimized by implementing the following mitigation measures:

- To reduce potential for noise complaints, the time and duration of detonations should consider the meteorological conditions that affect the peak noise level, and the noise travel distance. When possible, training should be conducted during daylight hours in conditions which are optimal for noise attenuation.
- Public relations may be required to promote awareness, and educate the nearby residential population. This may involve providing advance notices for detonation activities.

4.9.5 No Action Alternative

The no action alternative will result in continuation of existing noise levels as determined in the 1995 AICUZ study.

4.10 HEALTH AND SAFETY

Because project construction workers would be responsible for complying with standard operating procedures and applicable health and safety regulations, no impacts to health and safety would be expected from any of the four alternative locations during the construction process. AFMAN 91-201 will be followed during EOD training operations to minimize safety and health issues for personnel during operation.

Some emissions are expected from the EOD activities (Refer to Section 3.8 and 3.4.2). The primary residues of detonation will be RDX and TNT. Minor concentrations of these materials are anticipated from each detonation. A short term (15 min) limit of 3.0 mg/m³ has been established for RDX by the Occupational Safety and Health Administration (OSHA). WPAFB will need to assess actual exposure either through testing during operations or obtaining data from similar tests which have been conducted at equivalent facilities using equivalent materials.

Of critical importance in the selection process is the safety aspect of integrating the EOD operations with pre-existing activities at the site. As the primary feature of WPAFB is the active airfield, the safety associated with aircraft is paramount in the selection of an appropriate location for EOD activities. As described in Section 3.10 of this document, three restriction zones have been established to maximize safe operations of aircraft at military installations. The limits of the CZ, APZ1 and APZ2 are described in Figure 3.10. In addition to restrictions imposed by the facility AICUZ program, other isolation distances may apply for safe operation of the EOD site.

The potential for damage or injury due to concussive force of ordnance detonation was evaluated by a Professional Engineer using Blast/FX software to simulate the impact of detonation of up to 5 lbs of C4 equivalent. Results of the modeling demonstrated that at a distance of 100' or greater there is negligible potential for damage to structures or injury to persons (Appendix E).

The individual locations are described below:

4.10.1 Proposed Action: Skeel Avenue Site

The proposed location is situated outside of the Clear Zone, APZ1 and APZ2. The project site is located adjacent to and within a portion of the Huffman Prairie, an Ohio Natural Landmark. The site is located within 1250' of three (3) HazCargo staging pads and two staging stubs, and within approximately 1300' of a fourth HazCargo pad. The pads and stubs may, periodically be used to store munitions for approximately 1 - 3 days. The site is located within the potential blast contours of each of the pads.

At a minimum, mitigation measure should include highly effective coordination between EOD activities and hazardous cargo operations should this site be selected. WPAFB EOD staff has indicated that standard procedures include notification of critical personnel prior to each training event. This contact protocol will need to include coordination with the 88th Operations Support Squadron to prevent operation of the EOD training facility when hazardous cargo is present on the airfield within the HazCargo pads and staging stubs.

4.10.2 Alternative 1: Former EOD Site

As indicated in Section 3.10.2 of this document, the detonation point for ordnance at this location is outside of the APZ1. However, the 500 foot isolation radius from the EOD facility overlaps significantly with APZ1 (Refer to Figure 3.10). The AICUZ indicates that activities involving explosive detonations are incompatible with aircraft in the APZ. The AICUZ is silent, however, on whether the presence of an overlapping clear zone for an EOD site is a compatible use. As detonations are not intended to occur in the APZ, WPAFB should define whether the presence of the overlapping restriction zone around this alternative location is a compatible land use.

The site is located north of Riverview Road near the intersection with Symmes Road (refer to Figure 3.2.3--2b). Both roads are accessible by base personnel. While non-base personnel are restricted from this area, portions of the roads do not currently meet the 500 foot isolation requirements for safety protection mandated by AFMAN 91-201. As such, the affected portions of these roads would cease to be accessible for public use, at least during training exercises, if the EOD operation is sited in this location.

An additional potential concern during operations at this location is the risk of generating airborne contaminants by disturbing pre-existing contaminants remaining in the soil from previous EOD activities. There is no reliable way to estimate the potential emissions created by detonations at the site. It is prudent to institute a procedure of personal air monitoring in conjunction with an industrial hygienist to quantify the potential concern once operations begin. If the concentrations are above acceptable levels

according to OSHA, the National Institute for Occupational Safety and Health (NIOSH), or Air Force policy, personal protective measures should be developed.

As an alternate, a clay pad may be constructed beneath the structure to minimize the potential for release of contaminants into the breathing zone of personnel.

4.10.3 Alternative 2: Hebble Creek Road Site

The proposed location is situated outside of the CZ, APZ1 and APZ2. The location is adjacent to a public use area operated by the National Park Service (Huffman Prairie Flying Field) and accessed by a public use road (Hebble Creek Road). Based on the blast calculations conducted by WPAFB, there is no significant risk of personal injury to the general public or base personnel resulting from detonation of explosives at the proposed EOD site. In addition, WPAFB has the ability to restrict access to the public road as may be necessary for uses critical to its mission which will further isolate the general public from health and safety risks associated with an EOD range at this location.

The results of overblast calculations described previously in this section demonstrate that no injury or structural damage from concussive force will occur at either the hangar or storage facility at the nearby HPFF as a result of operation of the EOD range.

4.10.4 Alternative 3: Sandhill Location

This location is situated entirely within the APZ1 (Refer to Figure 3.10) northeast of the runway in the line of approach. In addition to its latitudinal/longitudinal location within the APZ1, the elevation at the proposed site is approximately 40 feet higher than the estimated elevation at the airstrip. Based on these location characteristics, use of this land for activities involving explosives is incompatible with the guidelines provided in Appendix A of the AICUZ which states that the objective of the AICUZ is to prevent uses which include above-ground explosive, fire, toxic, corrosive, or other hazardous characteristics. The following table represents applicable prohibited activities which apply to the proposed project at this location:

Table 4.10.4: Prohibited Activities in APZ1

Reference Document	Prohibited Activity	
UFC 3-260-01 SECTION 3	Activities which produces smoke, glare, or involve explosives are prohibited in APZI / II	A waiver would be required in order to conduct EOD activities at this alternative location
UFC 3-260-01 B9-3	Explosives and explosive facilities are prohibited from being located in Accident Potential Zones (APZ) I and II and clear zones as set forth in AR 385-10; DAPAM 385-64, Chapter 5; AFMAN 91-201; and AFI 32-7063.	
UFC 3-260-01 and AFMAN 91-201, 12.39.3	Activities involving explosives are prohibited from Accident Potential Zones (APZ) I and II and clear zones (CZ) of all aircraft landing facilities as depicted and described in UFC 3-260-01, <i>Airfield and Heliport Planning and Design</i> and defined by the MAJCOMs	

Should WPAFB choose to establish EOD activities at this location, a waiver for this incompatible use would be required as indicated in the above table. At a minimum, mitigative measures including highly effective coordination would be required between EOD activities and Aircraft Control functions to ensure that explosions do not occur during approach and landing events.

4.10.5 No Action Alternative

If the No Action Alternative were selected, a significant adverse impact to the EOD mission at WPAFB would occur. EOD personnel would either be required to conduct EOD activities at an off-base location or would not receive required training. Should personnel be inadequately trained due to lack of proper facilities for EOD training, the health and safety of Air Force EOD personnel will be at great risk during deployment.

Should off-base training be required, additional health and safety issues would arise for both EOD personnel and the public as explosives may be transported to the off-site location for use, increasing the exposure for accidental detonation. In addition, there would be a substantial increased cost to the Air Force to fund travel and lodging expenses for EOD personnel to train off-site. The closest DoD EOD range to WPAFB is Fort Knox, located in Kentucky, which is a 3 hour, 205 mile drive over public roads and interstates. The No Action Alternative does not meet the Air Force requirements and mission of locating an EOD flight at WPAFB.

4.11 SOCIOECONOMICS

All the alternatives would require construction and therefore would generate short-term construction-related employment. EOD training may result in some employment, and correspondingly influence long term positive impact on the local economy.

The Hebble Creek Road location, as described in Section 3.7, is located in the vicinity of the HPFF, a popular tourist destination which is accessible to the public during scheduled hours. While data is not collected on the number of visitors visiting the HPFF, the NPS contends in their correspondence dated 1 May 2009 (Appendix A) that a large majority of the 18,000 tourist known to have visited the Huffman Prairie Flying Field Interpretive Center (HPFFIC) in 2008 likely experienced the HPFF as well and that operation of the EOD range at this location will impact the HPFF visitor experience and potentially discourage tourism to the attraction.

The NPS response is based on the potential for operation of the EOD range at the maximum level of 3 days per week, 8 hours per day. Actual usage of the range is expected to be approximately 1 day per week with a single detonation per day. The majority of visitors to the HPFF will tour the site at times that the range is idle. Visitors observing the HPFF during training exercises will not generally experience repetitive detonation noise. Based on the actual infrequent occurrence of detonation at the range is expected to reduce the level of potential impact to minor levels. The No Action Alternative would result in no change in socioeconomic conditions at WPAFB.

4.12 TRANSPORTATION/TRAFFIC

Explosives transported for the purposes of EOD training exercises are likely to include Class 1.1 – 1.4 materials as defined in 49 CFR 173.50. When transporting explosives on an Air Force installation, criteria within AFMAN 91-201 apply. This guidance generally follows the regulations established for transporting explosives in 49 CFR with directives on the type of vehicle used to transport the explosives

and suitable on and off-base transportation routes. The basic transporting regulations per 49 CFR include: placarding (Part 172, Subpart F); packaging (Part 173), segregating (Part 177 Subpart C); and drivers training (Part 177).

AFMAN 91-201 allows for some flexibility in segregation of explosives (AFMAN 91-201; 8.7) when they are transported on base property. For example, the AFMAN 91-201 allows for movement of minimum quantities of explosive items necessary for demolition operations, to include proficiency training. Blasting caps, demolition explosives and unserviceable (but not dangerously unserviceable) munitions in the same vehicle. Similar mixing of explosives is not allowed in 49 CFR for off-base transportation.

4.12.1 Proposed Action and Alternatives 1 and 2: Skeel Avenue, Former EOD, and Hebble Creek Road Sites

Transportation routes intended for use leading to and from the Proposed Action and alternative locations at the Skeel Avenue Site, Former EOD Site, and Hebble Creek Road Site are reported to use roads controlled by WPAFB exclusively. Limiting transportation to on-base routes allows WPAFB to minimize the potential impact to civilian populations and reduce security risks associated with transporting hazardous materials over public roadways. Transportation of explosives poses inherent safety impacts, however the potential impact is considered to be limited due to the ability for EOD personnel to transport these hazardous materials on roadways controlled by WPAFB.

When transporting on base, the safest possible primary and alternate route for the movements of explosives must be selected. These routes should be planned such that population intensive areas on-base and key mission-orientated facilities and equipment are avoided. On base movement of explosives allows the transporters more flexibility in areas such as segregation of small amounts of explosives and exceptions to placarding requirements, however, AFMAN 91-201 recognizes and requires the basic regulations within 49 CFR.

4.12.2 Alternative 3: Sandhill Location

When transporting explosives to the Sandhill Location, vehicles would travel on base as well as off base. Transporting explosives off base would increase the amount of preparation prior to the movement of the explosives and increase the potential exposure for accidental detonation, vandalism and terrorist threats. This would not hinder the movement of the explosives; however it would increase the workload and potential safety during transportation of the explosives.

Off base transportation follows the hazardous materials transportation regulations contained in 49 CFR as well as guidance outlined in AFMAN 91-201. The 49 CFR requires that persons offering a placarded load for transportation must have a DOT security plan. The plan requires an evaluation of potential hazards associated with transportation, security measures and responses to incidents. WPAFB would be required to develop and adhere to this plan.

Mitigating measures may include planning transportation events to correspond with the lowest traffic volume and reducing the frequency of training events to reduce the hazard exposure.

4.12.3 No Action Alternative

Should the No Action Alternative be selected, EOD training would either not occur, or would be conducted at a remote location. Should transportation to a remote, off-base location for training events be required, a significant increase in exposure to hazardous materials would occur not only for WPAFB personnel, but also for civilians along the transportation route.

The 49 CFR requires that persons offering a placarded load for transportation must have a DOT security plan. The plan requires an evaluation of potential hazards associated with transportation, security measures and responses to incidents. WPAFB would be required to develop and adhere to this plan.

4.13 UTILITIES

As no permanent utilities will be required for operation of the EOD site, only existing utilities which may be impacted are considered below.

4.13.1 Proposed Action: Skeel Avenue Site

An underground telecommunications line is located approximately 140 feet northeast of the proposed EOD facility (Figure 3.13a). The coaxial cable is outside of the 100 foot isolation distance specified in Section 3.28.1.1 of AFMAN 91-201. Similarly, underground electrical service lines are located approximately 150 feet south of the proposed EOD structure. The nearest underground storm water line is approximately 600 feet southeast of the proposed EOD facility. No overhead utility lines were observed within 500 feet of the project site.

4.13.2 Alternative 1: Former EOD Site

There are no utilities traversing within 500 feet of the former EOD site, and thus this alternative has no impacts on the utilities. Figure 3.13a13b shows utilities in the vicinity of this alternative location.

4.13.3 Alternative 2: Hebble Creek Road Site

An electrical overhead cable line traverses near the center of the proposed EOD facility. This cable line would need to be moved out of the 500 foot clear zone. Therefore, this alternative has minor short-term low impacts to utilities and labor. Figure 3.13b13c shows utilities in the vicinity of this alternative location.

4.13.4 Alternative 3: Sandhill Location

An electrical overhead cable line traverses the location approximately 400 feet from center of the EOD facility. This cable line would not be impacted by the detonations. Figure 3.13c13d shows utilities in the vicinity of this alternative location. Additionally, a water line exists in the general vicinity however, it is outside of the 500 foot clear zone surrounding the proposed EOD site.

4.13.5 No Action Alternative

There are no impacts on any utilities as a result of the No Action Alternative.

4.14 ENVIRONMENTAL JUSTICE

Construction associated with the proposed EOD training facility would occur within the boundaries of WPAFB. As discussed in Section 4.11, there would be both short-term and long-term beneficial impacts on the local and regional economy from the construction and operation of the facilities that will support additional new staff at WPAFB. There is little potential for any of the alternatives to have a disproportionately high adverse human health or environmental effect on low-income and minority populations that are located outside the boundaries of WPAFB at the preferred location or Alternative Location 1 and 2. Similarly, there would be no environmental justice issues with the No Action Alternative.

The Sandhill location will impose noise of a sporadic, percussive character on a densely populated residential neighborhood of lower-to-medium priced homes. This is a neighborhood in which there are likely to be shift workers who may need to sleep days. This is a neighborhood of homeowners, the

majority of whom are not directly associated with the Base or this mission, whose health can be affected; and whose property values will potentially be negatively affected by establishment of the EOD range at the Sandhill alternative location.

Correspondence was received in response to the public notice include a letter from a resident dated 21 April 2008 in the vicinity of the Sandhill location who expressed concerns over quality of life and property value impacts which are perceived to result from location of the EOD operations at this location. Resident correspondence and the WPAFB response to the correspondence are provided in Appendix A.

4.15 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable impacts which would result from development of the EOD Proficiency Training Range at WPAFB are summarized below:

4.15.2 Vegetation

An unmitigated loss of approximately 0.5 – 1 acre of existing natural vegetation will occur depending on the selected location for the EOD blast structure. The structure itself, including access, ordnance staging and parking areas will, necessarily, occupy approximately 0.5 acres of space.

4.15.3 Hazardous Materials / Waste

Residues are generated from detonation of explosives (primarily RDX and TNT) during training operations.

4.15.4 Land Use

There will be an unmitigated loss of approximately 0.5 acres of open space at each of the potential project locations. Land use will be re-classified at the Hebble Creek, Sandhill and Skeel Avenue Sites from open to industrial.

4.15.5 Air Quality

Air emissions will occur as a consequence of operating an EOD range. Detonation of explosives will result in the generation of air emissions as described in Section 4.8. Mitigation measures may control transport of contaminants from the detonation area, however, emissions are an unavoidable consequence of detonation of ordnance.

4.15.6 Noise

Intermittent noise resulting from detonations will occur as a result of establishing and operating an EOD range at WPAFB. Detonations will produce noise at an expected average level of 83dB-A at a distance of 3,000 feet from the point of detonation. Peak noise levels at a distance of 3,000 feet are expected to be 129 dB. The moderate impacts which may be expected include the potential for noise and vibration complaints from residents of the Brick Quarters Historic District resulting from operation of the EOD range at the preferred alternative (Skeel Avenue) location. A MOA has been executed between the USAF and the OHPO which satisfies the concerns of the agency expressed in various correspondences (Appendix A). With the MOA in place, the OHPO supports the selection of the Skeel Avenue location as the preferred site for the Proposed Action.

Local residents of the area in the vicinity of the Sandhill alternative, while accustomed to noise currently generated near the runway glidepath (Figure 4.9-1,2), may lodge complaints based on the intermittent noise contributed by operation of the EOD range at this location.

The NPS asserts that the cultural experience of visitors to the HPFF would be negatively impacted should the range be operated at the Hebble Creek Road location. In addition, reduced visitation of the HPFF may result from adverse reactions of tourists to the additional noise generated by detonations near the HPFF.

Some temporary displacement of local wildlife may occur at each of the four proposed locations. As baseline noise in each of the locations is within the 80dB-A contour, resident wildlife has adapted to elevated noise conditions and is expected to become de-sensitized to the additional noise generated by operation of the EOD range.

4.15.7 Health and Safety

The operation of an EOD range adds an inherent danger to personnel involved in the training activities as well as those in the surrounding area. Operational controls can minimize potential dangers to personnel and approaching/departing aircraft, however, the act of detonating ordnance will pose health and safety risks.

4.16 RELATIONSHIP OF SHORT TERM USES AND LONG TERM PRODUCTIVITY

Short term impacts of the proposed EOD activities at WPAFB include those effects of construction and operation of individual training events at the site. Long term use of property for EOD training activities introduces long term impacts and permanent resource loss.

The overall loss of open space is limited to less than approximately 1 acre which represents approximately 0.01% of the installation as a whole.

A potential increase in short term health and safety impacts is possible as a result of operation of the EOD range. The long term positive impact of adequate training of personnel involves the potential for reducing detonation related injury of personnel during military operations at off-base locations.

Long term productivity of training at the installation and long term effectiveness of personnel in completing mission requirements will be enhanced by establishing the EOD range at WPAFB.

4.17 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible environmental changes and irretrievable commitment of resources which would result from the proposed action may include consumption of resources such as energy and water; permanent land use changes; human resources (labor); and elimination of habitat or other natural resources.

4.17.1 Natural Resources

Implementation of the proposed activity will eliminate between 0.5 acre and 1 acre of natural vegetation and wildlife habitat depending on the selected location. An undefined potential for permanent disruption of some wildlife species may also be a consequence of the operation of the proposed EOD range (Section 4.2.2).

4.17.2 Cultural Resources

The Hebble Creek Road location, as described in Section 3.7, is located in the vicinity of the HPFF, a popular tourist destination which is accessible to the public during scheduled hours. While data is not collected on the number of visitors visiting the HPFF, the NPS contends in their correspondence dated May 1, 2009 (Appendix A) that a large majority of the 18,000 tourist known to have visited the Huffman Prairie Flying Field Interpretive Center (HPFFIC) in 2008 likely experienced the HPFF as well and that operation of the EOD range at this location will impact the HPFF visitor experience and potentially discourage tourism to the attraction.

The NPS response is based on the potential for operation of the EOD range at the maximum level of 3 days per week, 8 hours per day. Actual usage of the range is expected to be approximately 1 day per week with a single detonation per day. The majority of visitors to the HPFF will tour the site at times that the range is idle. Visitors observing the HPFF during training exercises will not generally experience repetitive detonation noise. Based on the actual infrequent occurrence of detonation at the range is

expected to reduce the level of potential impact to minor levels. In addition, educational efforts such as signs will assist in preparing visitors for the potential of sporadic detonation noise,

4.17.3 Human Resources

Construction and operation of the proposed facility will require investment of human resources in the form of labor activities required to build, operate and maintain the structure. Assignment of personnel to build, operate and maintain the structure may either re-allocate labor from other activities at the installation, or may involve allocation of outside labor.

4.17.4 Energy Resources

Installation, maintenance and operation of the facility would require an expenditure of energy resources. These include fuel utilization during construction activities and for the purposes of transporting ordnance to the training area; fuel required to manufacture the pre-cast detonation structure; electricity and fuel utilized through portable generators to provide light during construction and/or training exercises; and energy required to produce ordnance which will be detonated for training purposes.

4.17.5 Land Use

Establishing the proposed activity at WPAFB will permanently affect land use in the area. Approximately 1 acre, depending on the site location, will be required to establish the EOD range. This area includes the physical area occupied by the barricade, area covering the 200 feet wide combustible free zone, and permanent access control (ie. fence surrounding the EOD area, parking and driveways). Proportionally, the area subject to permanent alteration represents approximately 0.01% of the total area occupied by the installation.

4.18 CUMULATIVE IMPACTS

40 CFR 1508.7 describes cumulative impact as an effect on the environment which results from the incremental impact of an action when added to other past, present and future actions. This section is intended to describe how individual impacts expected as a result of the proposed action would affect the environment when considered in conjunction with direct and indirect effects of other activities, where applicable, at the installation.

4.18.1 Natural Resources

WPAFB is the site of numerous military operational and support functions inclusive of aircraft activity, construction, vehicular traffic, installation maintenance (ie, mowing, snow removal, street sweeping, etc.).

Establishment of an EOD Training site will result in an incremental increase in human activity and noise as well as eliminating an isolated area of vegetation/habitat.

WPAFB is configured as a long and narrow property with the airstrip as the primary feature encompassing much of the north-south length of the installation. As such, each of the proposed project locations is located within proximity to noise and human activity. The most remote alternative location is the Sandhill site, which is isolated to some degree from activities on the rest of the base. As such, the impacts on wildlife may be more noticeable at this location than other alternative locations on the installation where wildlife is likely to have become habituated to the noise/activity from other functions conducted at the installation.

Much of the base is occupied by developed areas such as airstrips, buildings, parking lots and roadways. The removal of natural vegetation as a result of implementing the proposed activity will contribute to an overall loss of vegetation/habitat, however, the proposed area of vegetation loss is limited to approximately 0.5 acres at each of the alternative locations. The incremental effect of the proposed activity is expected to be negligible based on the overall area to be disturbed and the potential for wildlife to re-establish in other suitable areas at WPAFB.

The Skeel Avenue Site is located adjacent to and overlapping on the Huffman Prairie, a tallgrass prairie which is a recognized Ohio Natural Landmark. Construction and operation of the proposed EOD operation at this location will result in the removal and relocation of up to approximately 18 acres of managed prairie vegetation and habitat. The project would include mitigation in the form of planting of suitable areas adjacent to the prairie to compensate for the loss of natural vegetation. While short-term impacts are unavoidable at this location, mitigation measures should minimize cumulative effects of habitat loss due to ongoing human activity at the installation.

4.18.2 Water Resources

There is a minor potential for groundwater impact as a result of the proposed EOD training activities at the Hebble Creek Road, Sandhill and Skeel Avenue sites. Numerous areas of known historic groundwater impact have been identified during environmental investigation at WPAFB. Adequate groundwater monitoring and treatment technologies are in place at the base. Therefore, the minor potential for additional groundwater impact from EOD operations is not expected to pose a significant impact at either of these locations.

Previous activities at the Former EOD Site have resulted in residual soil impact which has remained after closure. Should this site be selected for establishment of the proposed EOD range, the presence of pre-existing impact may exacerbate the potential for groundwater impact from the proposed activity.

4.18.3 Land Use

As mentioned in Section 4.18.1, much of the base is occupied by developed areas such as airstrips, buildings, parking lots and roadways. Each of the proposed locations for the EOD range are currently characterized as open space, although the Former EOD Site use is limited to industrial activities as a function of the RCRA closure completed in 1997 (Section 3.4.1/4.4.1).

The removal of natural vegetation as a result of implementing the proposed activity will contribute to an overall loss of vegetation at the installation. However, the proposed area of vegetation loss is limited to less than approximately 1 acre at each alternative location. Loss of natural habitat near the Skeel Avenue Site is expected to be mitigated through planting of native vegetation in surrounding areas away from the proposed EOD activities. The incremental effect of the proposed activity is expected to be negligible based on the overall area to be disturbed, mitigation measures and the potential for wildlife to re-establish in other suitable areas at WPAFB.

4.18.4 Soils

WPAFB maintains a comprehensive Storm Water Management Plan and holds a NPDES permit which covers surface water discharges from the property. Soils disturbed by the proposed activities cover less than approximately 1 acre at each alternative location. Soil erosion measures would be implemented during construction activities followed by reseeding the bare areas. The cumulative effect of the proposed activity is expected to be negligible.

4.18.5 Cultural Resources

As described in Section 4.7 of this EA, WPAFB has worked with the OHPO to develop controls to mitigate the concerns raised in letters dated 20 January 2009 and 22 June 2009 respectively (Appendix A). On 22 June 2009, a letter was issued by the OHPO which documented that the Section 106 consultation had been satisfied for the Sandhill and former EOD alternative locations. A Memorandum of Agreement (MOA) was subsequently executed between OHPO and the US Air Force to address remaining concerns regarding potential impacts from noise and visual impacts which may occur with the development of an EOD range at the Skeel Avenue (preferred alternative) and Hebble Creek Road Sites.

The executed MOA is provided in Appendix A and represents satisfactory resolution of the issues identified by OHPO.

Based on past, present and foreseeable future activities planned near the proposed locations, significant cumulative impacts on historic properties are not anticipated if the EOD range is located at the preferred alternative (Skeel Avenue), or any of the other alternative locations.

4.18.6 Air Quality

Based on the operations schedule proposed by WPAFB, emissions from the proposed EOD operations may require a Permit to Install (PTI) be issued by the OEPA. The addition of this new emissions source would require revision of the facility Title V Permit. The emissions from this specific source will be added to the overall emissions at the site for the purposes of permitting, monitoring and reporting, although amendment of the current Title V permit will not be required.

4.18.7 Noise

The 1995 AICUZ Study prepared for the Base indicates that all three of the proposed project areas are located within the 80 dB-A DNL contour. Operation of an EOD range will contribute additional intermittent noise which was not taken into consideration when the 1995 study was completed.

As detailed in Section 4.9 of this document, residential development is not recommended in areas in which noise contours exceed 65 dB-A. Off-site residential development is located within 3,000 feet of the Sandhill Location and approximately 3,000 feet from the Skeel Avenue Site. Studies from other EOD operations (Section 4.9) indicate that peak noise levels of 129 dB may be expected at 3,000 feet from the point of detonation. This level of noise may significantly affect the response of residents in the Sandhill and the historic residential area east of the Skeel Avenue Sites. This may be a particular issue at the Sandhill location considering that background noise from current base activities has historically elicited complaints from residents.

The Former EOD Site and the Hebble Creek Road Site are more isolated from residential areas; however, the Hebble Creek Road Site is located within 900 feet of a national park which is frequented by the public as a tourist attraction. The expected peak noise during detonation at 1,250 feet from point of detonation is 136 dB.

4.18.8 Health and Safety

The Sandhill Alternative Location is situated within the APZ1 as described in Sections 3.10 and 4.10 of this document. Operation of an EOD range at this location will add additional health and safety risk to both EOD operations as well as aircraft operations based on its location within the aircraft approach.

The presence of previous impact at the Former EOD Site will contribute to potential health and safety exposure should this alternative be selected. Pre-existing impact may become airborne or exposed to the ground surface allowing human inhalation and/or contact.

Concurrent operation of the proposed EOD facility and the Huffman Prairie Flying Field tourist attraction may increase traffic in the local area, posing additional health and safety as well as security issues.

The Skeel Avenue Site is located within the arc of influence of several HazCargo staging areas as described in Section 4.10. Operational controls such as coordination and notification which is required prior to any EOD training event should preclude concurrent operation of the EOD training area during times when munitions or other explosive cargo are staged near the EOD facility. Significant cumulative impacts are, therefore, not expected.

4.18.9 Socioeconomics

According to both the NPS and National Aviation Heritage Alliance (NAHA), they feel that future attendance to the HPFF may be impacted due to the potential negative effects from the noise of the detonations. These agencies feel that the visitor experience will be distracted by the noise. To help mitigate the noise impact to the visitor, as required by the SHPO MOA, WPAFB will install an interpretive sign at HPFF that explains the purpose of the EOD range and the source and nature of the sounds that originate from it. The intent is to diminish the impact to the visitor through education and awareness. According to NAHA, it is projected that a significant decline in the visitor experience would occur if the EOD facility were located at the Hebble Creek Road Site (Alternative 2).

In the past, negative comments were received from HPFF visitors regarding the noise from firing weapons, when the Combat Arms Training and Maintenance Facility (CATM) was in operation. Relocation of the CATM was in part justified by the impact it created on the HPFF. If the EOD range was located at the Hebble Creek Road Site, NAHA estimates that a 10% decline of visitation to the HPFF would occur, which would result in an annual economic loss of \$200,000 in the Dayton region (calculated by use of the Dayton Region Tourism Economic Impact model prepared by Economic Stewardship,

Sturgeon Bay, WI) . It was also NAHA's opinion that the Proposed Action, Skeel Avenue Site, would create less of a noise impact to the HPFF given the distance and prevailing winds at WPAFB.

5.0 LIST OF AGENCIES AND PERSONS CONTACTED

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Fish and Wildlife Service
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Mr. Victor Erewele, M.S., P.E.
Structural Engineer, USAF
(Blast Overpressure Calculations, Appendix E)

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WPAFB. 2006. ICRMP.

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8.0 ABBREVIATIONS AND ACRONYMS

°F	Degrees Fahrenheit
88 ABW	88 th Air Base Wing
AAFES	Army and Air Force Exchange Service
ACHP	Advisory Council on Historic Preservation
AF	Air Force
AFB	Air Force Base
AFI	Air Force Instruction
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health Program
AFPD	Air Force Policy Directive
AFRC	Air Force Reserve Command
AFSC	Air Force Safety Center
AGE	Aerospace Ground Equipment
AGL	Above Ground Level
AICUZ	Air Installation Compatible Use Zone
AOC	Area of Concern
APE	Area of Potential Effects
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
AR	Aerial Refueling
ARB	Air Reserve Base
ART	Air Reserve Technician
ASC	Aeronautical Systems Center
AST	Aboveground Storage Tank
ATC	Air Traffic Control
BAI	Backup Aircraft Inventory
BAM	Bird Avoidance Model
BASH	Bird/Wildlife Aircraft Strike Hazard
BGS	Below Ground Surface
BHE	BHE Environmental, Inc.
BMP	Best Management Practice
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CATEX	Categorical Exclusion
CATM	Combat Arms Training and Maintenance Facility
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CWA	Clean Water Act
CZ	Clear Zone
dB	Decibel
dBA	A-Weighted Decibel
DLSME	Defense Land Systems and Miscellaneous Equipment
DNL	Day-Night average A-weighted Sound Level
DOD	Department of Defense
EA	EA: Environmental Assessment

EIAP	Environmental Impact Analysis Process
EIFS	Economic Impact Forecast System
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
ESZ	Explosive Safety Zone
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
ft ²	square feet
HUD	U.S. Department of Housing and Urban Development
I	Interstate
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
mg/m ³	milligrams per cubic meter
MCD	Miami Conservancy District
MOA	Memorandum of Agreement
MSL	mean sea level
MTR	military training route
NAAQS	National Ambient Air Quality Standards
NAHA	National Aviation Heritage Alliance
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NO ₂	Nitrogen dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NO _x	Nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRCC	National Regional Climate Center
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSR	New Source Review
NWI	National Wetlands Inventory
OEPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
OSHA	Occupational Safety and Health Administration
PM _{2.5} , 10	particulate matter less than or equal to 2.5 or 10 microns
POL	petroleum, oil, and lubricants
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
SEL	sound exposure level
SHPO	State Historic Preservation Officer

SIP	State Implementation Plan
SWPPP	Storm Water Pollution Prevention Plan
TNC	The Nature Conservancy
tpy	tons per year
TSD	Treatment, Storage, and Disposal
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USDA-WS	U.S. Department of Agriculture-Wildlife Services
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
yd ²	square yards
µg/m ³	micrograms per cubic meter

PLATES



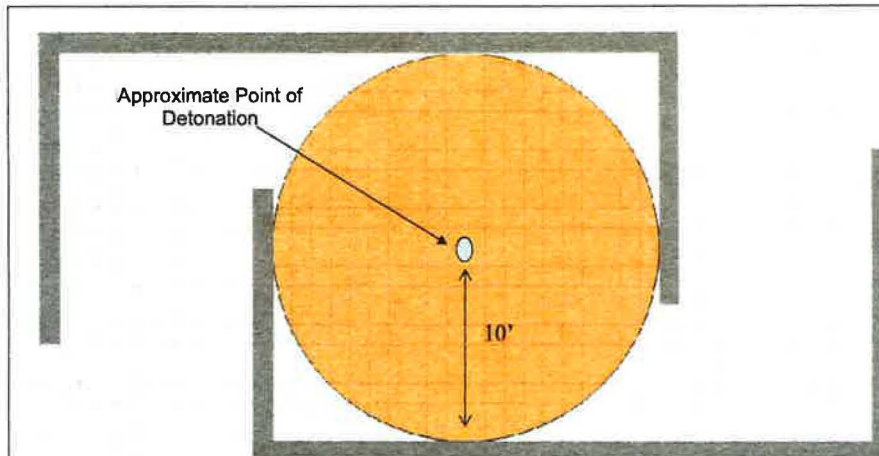
REPRESENTATIVE ENTRANCE TO STRUCTURE
(1 OF 2 INGRESS/ EGRESS POINTS)



REPRESENTATIVE WALL THICKNESS



REPRESENTATIVE TEMPORARY STAGING AREA FOR ORDINANCE



Pre Cast Detonation Bunker Specifications:

- Area will need to be no less than 46' x 24'
- 20' diameter circle
- Minimum of 10' from point of detonation to wall
- 300' clear zone surrounding structure
- 500' isolation distance from public roads, overhead utilities, property boundaries, and airstrips



DETONATION STRUCTURE CONFIGURATION AND DETAILS

PROJ: 085010037
SCALE: NONE
DATE: 10/23/08
PLATE: I

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
HEBBLE CREEK ROAD
SITE

DIRECTION:
NORTHEAST



APPROXIMATE CENTER OF PROPOSED BUNKER

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
HEBBLE CREEK ROAD
SITE

DIRECTION:
NORTH



TYPICAL VEGETATION AT LOCATION OF PROPOSED EOD FACILITY



SITE PHOTOGRAPHS
Hebble Creek Road Site Alternative

PROJ: 085010037
SCALE: NONE
DATE: 10/23/08
PLATE: II

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
HEBBLE CREEK ROAD
SITE

DIRECTION:
EAST



HEBBLE CREEK ROAD SITE LOOKING TOWARD HUFFMAN FLYING FIELD

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
HEBBLE CREEK ROAD
SITE

DIRECTION:
NORTHWEST



HEBBLE CREEK ROAD SITE LOOKING TOWARD FORMER EOD ALTERNATIVE



SITE PHOTOGRAPHS

Hebble Creek Road Site Alternative

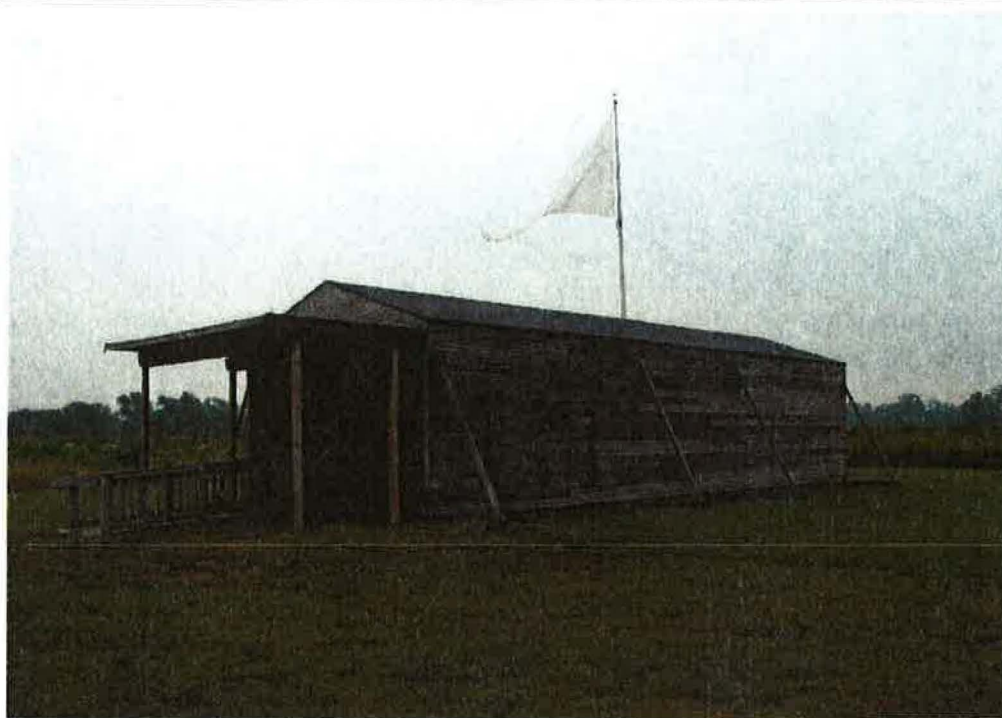
PROJ: 085010037
SCALE: NONE
DATE: 10/23/08
PLATE: III

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
HEBBLE CREEK ROAD
SITE

DIRECTION:
EAST - NORTHEAST



WRIGHT BROTHERS HANGAR

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
HEBBLE CREEK ROAD
SITE

DIRECTION:
WEST



VIEW FROM WRIGHT BROTHERS HANGAR TOWARD PROPOSED EOD SITE



SITE PHOTOGRAPHS
Hebble Creek Road Site Alternative

PROJ: 085010037
SCALE: NONE
DATE: 10/23/08
PLATE: IV

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
FORMER EOD AREA

DIRECTION:
SOUTHWEST



VEGETATION AT FORMER EOD AREA LOCATION

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
FORMER EOD AREA

DIRECTION:
NORTHWEST



FLOODPLAIN FOREST TO WEST OF FORMER EOD AREA



SITE PHOTOGRAPHS

Former EOD Alternative

PROJ: 085010037

SCALE: NONE

DATE: 10/23/08

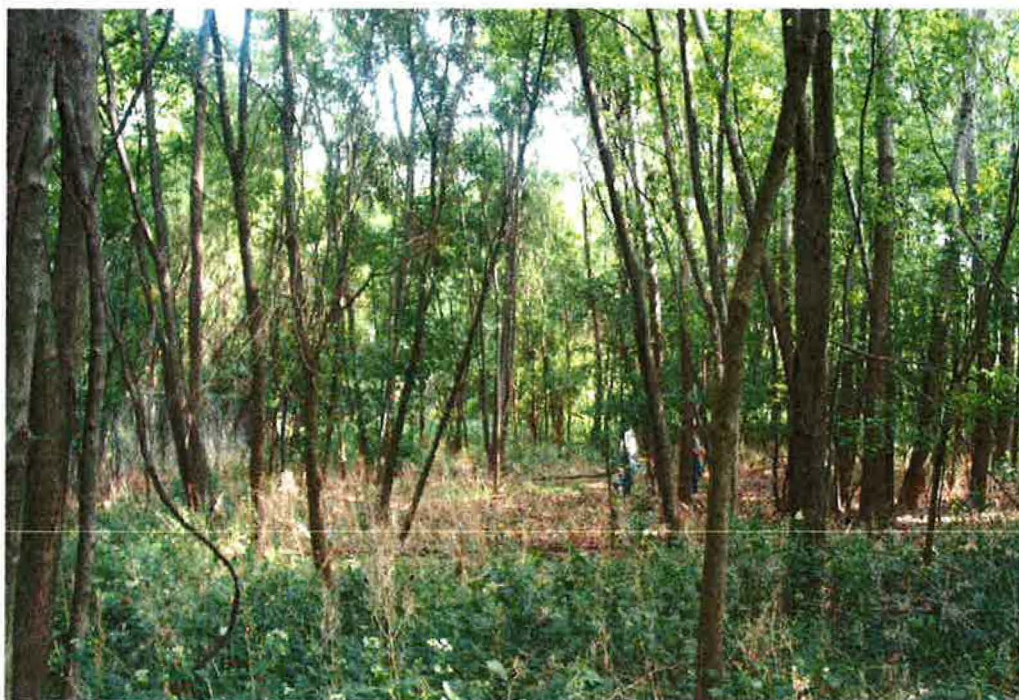
PLATE: V

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
FORMER EOD AREA

DIRECTION:
NORTHWEST



FLOODPLAIN FOREST LOCATED IN EOD CLEAR ZONE

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
FORMER EOD AREA

DIRECTION:
WEST



OPEN FIELD VEGETATION TOWARD CENTER



SITE PHOTOGRAPHS

Former EOD Alternative

PROJ: 085010037

SCALE: NONE

DATE: 10/23/08

PLATE: VI

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
SANDHILL SITE

DIRECTION:
NORTH



PROPOSED ACCESS ROAD FOR SANDHILL SITE

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
SANDHILL SITE

DIRECTION:
N/A



TYPICAL VEGETATION AT SANDHILL SITE



SITE PHOTOGRAPHS

Sandhill Alternative

PROJ: 085010037

SCALE: NONE

DATE: 10/23/08

PLATE: VII

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
SANDHILL SITE

DIRECTION:
NORTH



TYPICAL DISTURBED UPLAND HABITAT NEAR PROPOSED BUNKER LOCATION

DATE:
09/04/08

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
SANDHILL SITE

DIRECTION:
NORTHWEST



UPLAND HABITAT TRANSITIONAL AREA



SITE PHOTOGRAPHS

Sandhill Alternative

PROJ: 085010037

SCALE: NONE

DATE: 10/23/08

PLATE: VIII

DATE:
03/04/09

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
SKEEL ROAD SITE

DIRECTION:
SOUTHWEST



SOUTHERN HALF OF COMBUSTIBLE FREE ZONE

DATE:
03/04/09

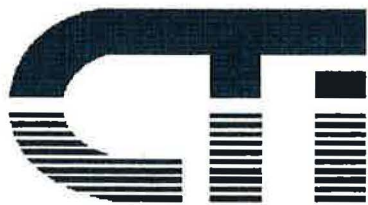
PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
SKEEL ROAD SITE

DIRECTION:
EAST



EOD FACILITY LOCATION



SITE PHOTOGRAPHS

Skeel Road Alternative

PROJ: 085010037

SCALE: NONE

DATE: 3/26/09

PLATE: IX

DATE:
03/04/09

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
SKEEL ROAD SITE

DIRECTION:
SOUTHWEST



PROJECT AREA FROM NORTHEAST CORNER OF HUFFMAN PRAIRIE

DATE:
03/04/09

PHOTOGRAPHER:
MATT SCHRAMM

LOCATION:
SKEEL ROAD SITE

DIRECTION:
NORTHEAST



NORTHERN HALF OF COMBUSTIBLE FREE ZONE



SITE PHOTOGRAPHS

Skeel Road Alternative

PROJ: 085010037

SCALE: NONE

DATE: 3/26/09

PLATE: X

FIGURES

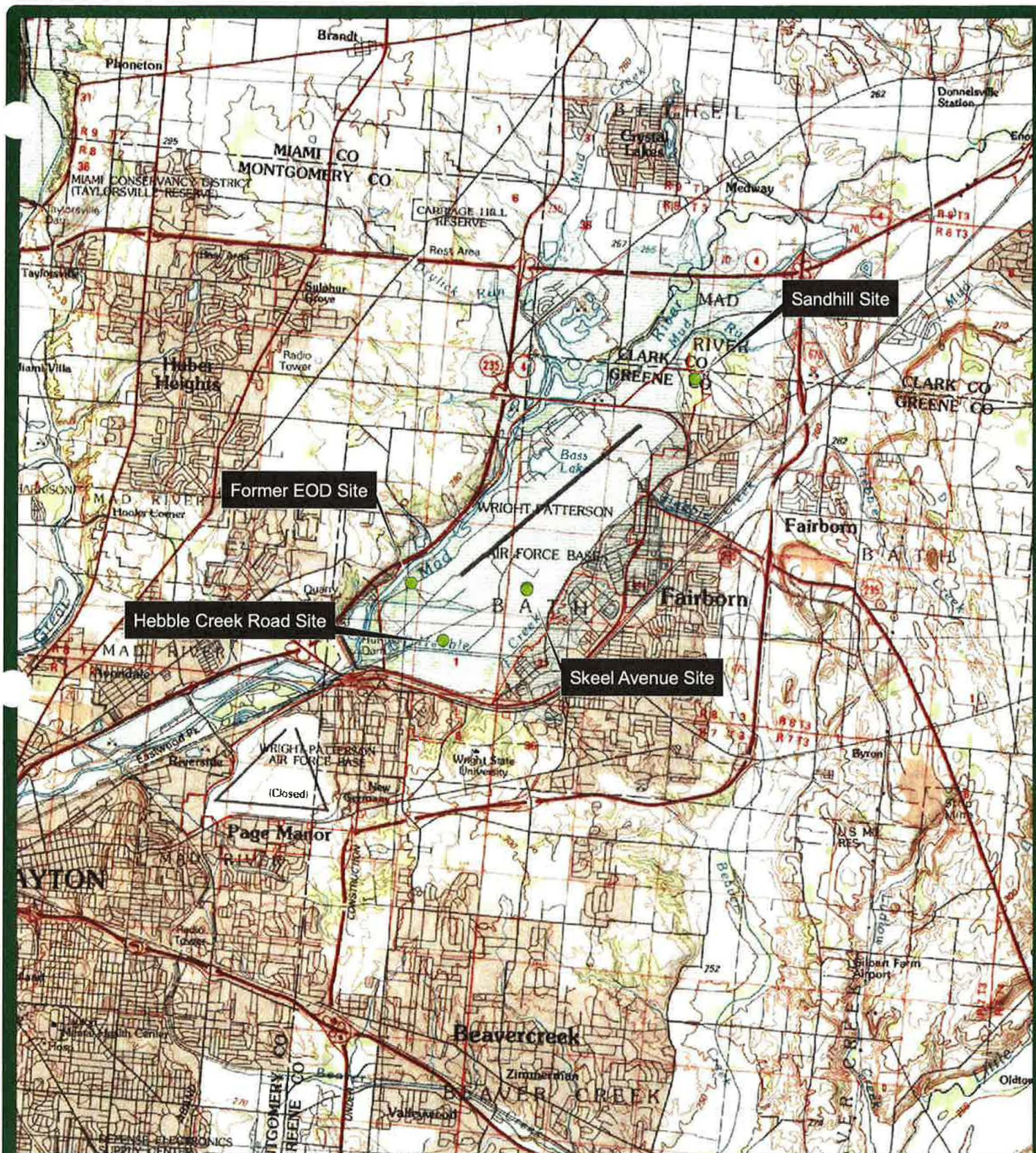


Figure 1.1. Project Location and Topography
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

0 0.75 1.5 Miles

Project Information
Project Number : 008-0185-01
Modified March 25, 2009

Legend

- Installation Area
- Detonation Structure Location

DRAFT

NRC
Nuclear Regulatory Commission

209 Commerce Parkway
P.O. Box 128
College Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.nrcdiffernce.com

Figure 2.3.1
Approximate Transportation Route
Dayton Bomb Squad Range

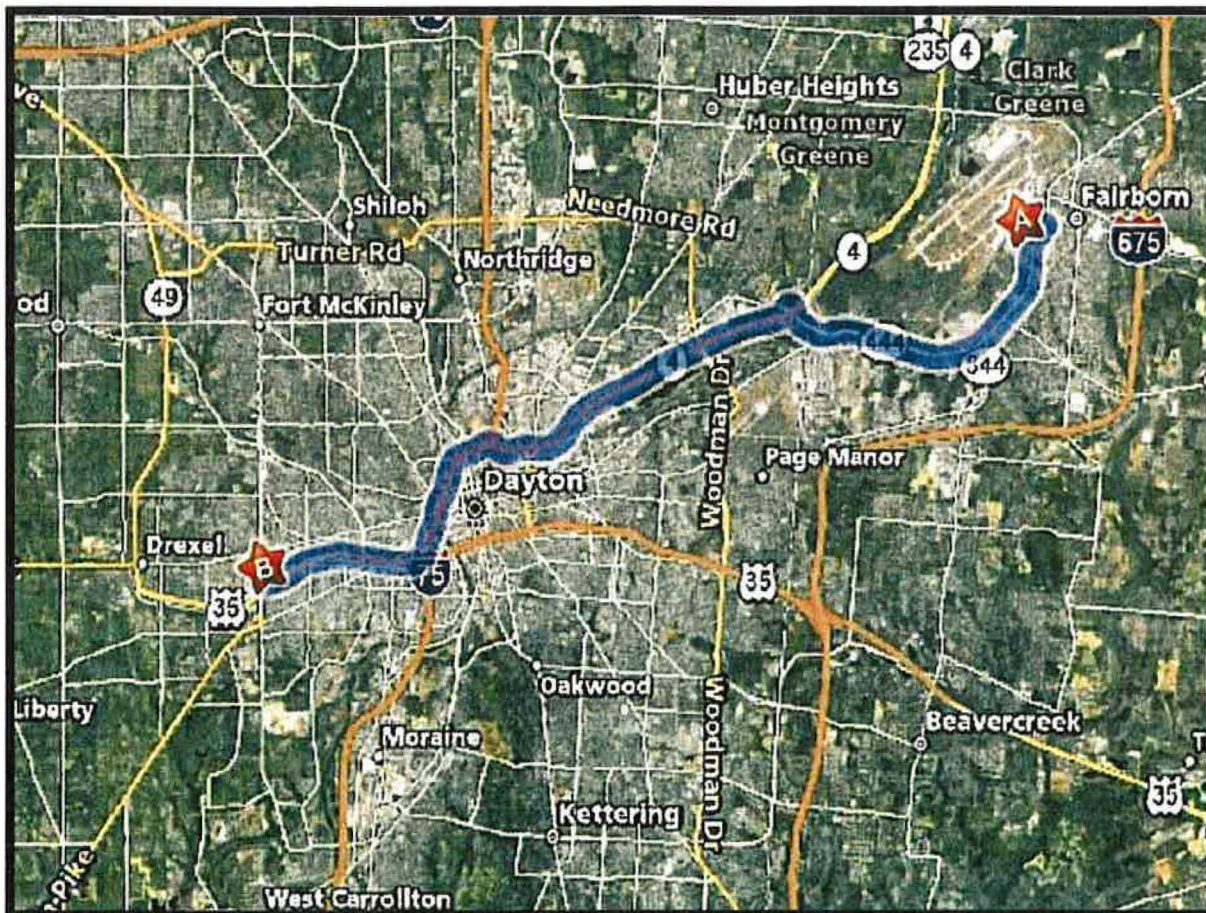
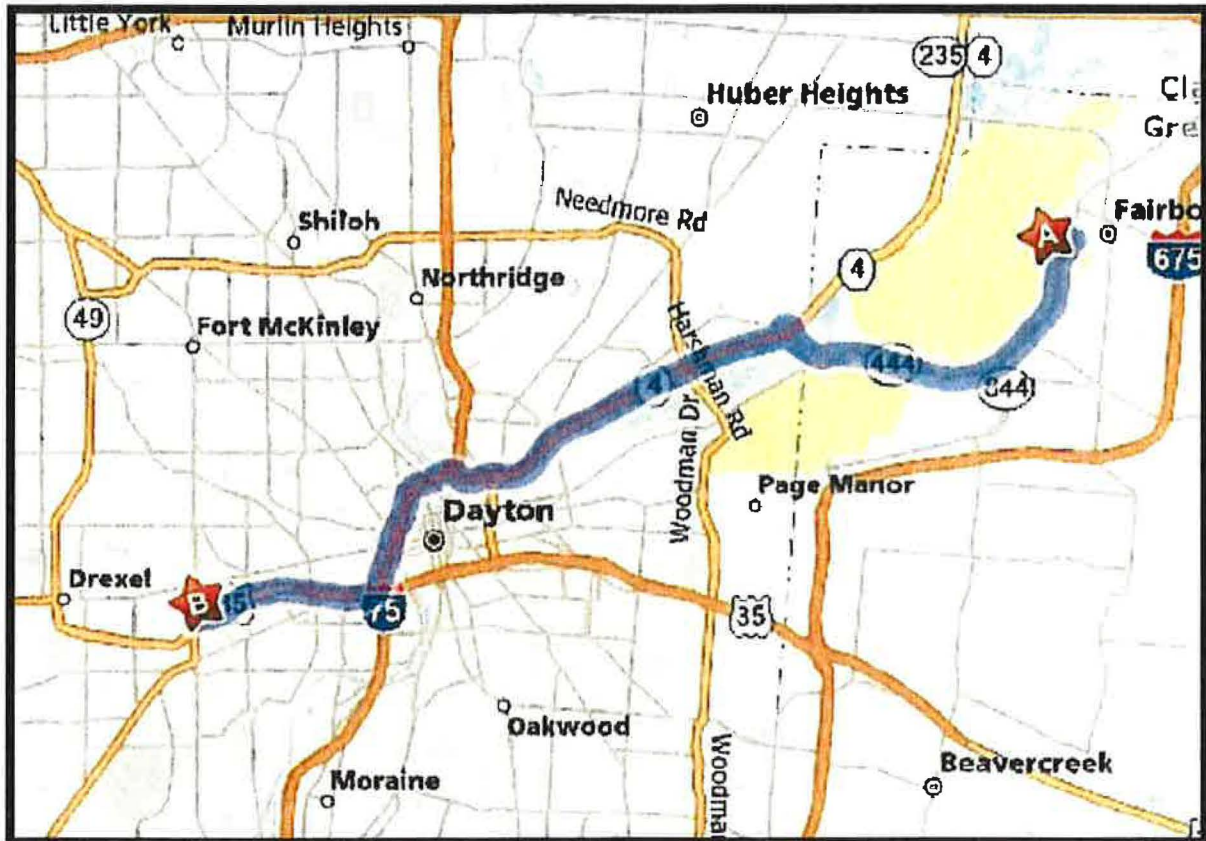
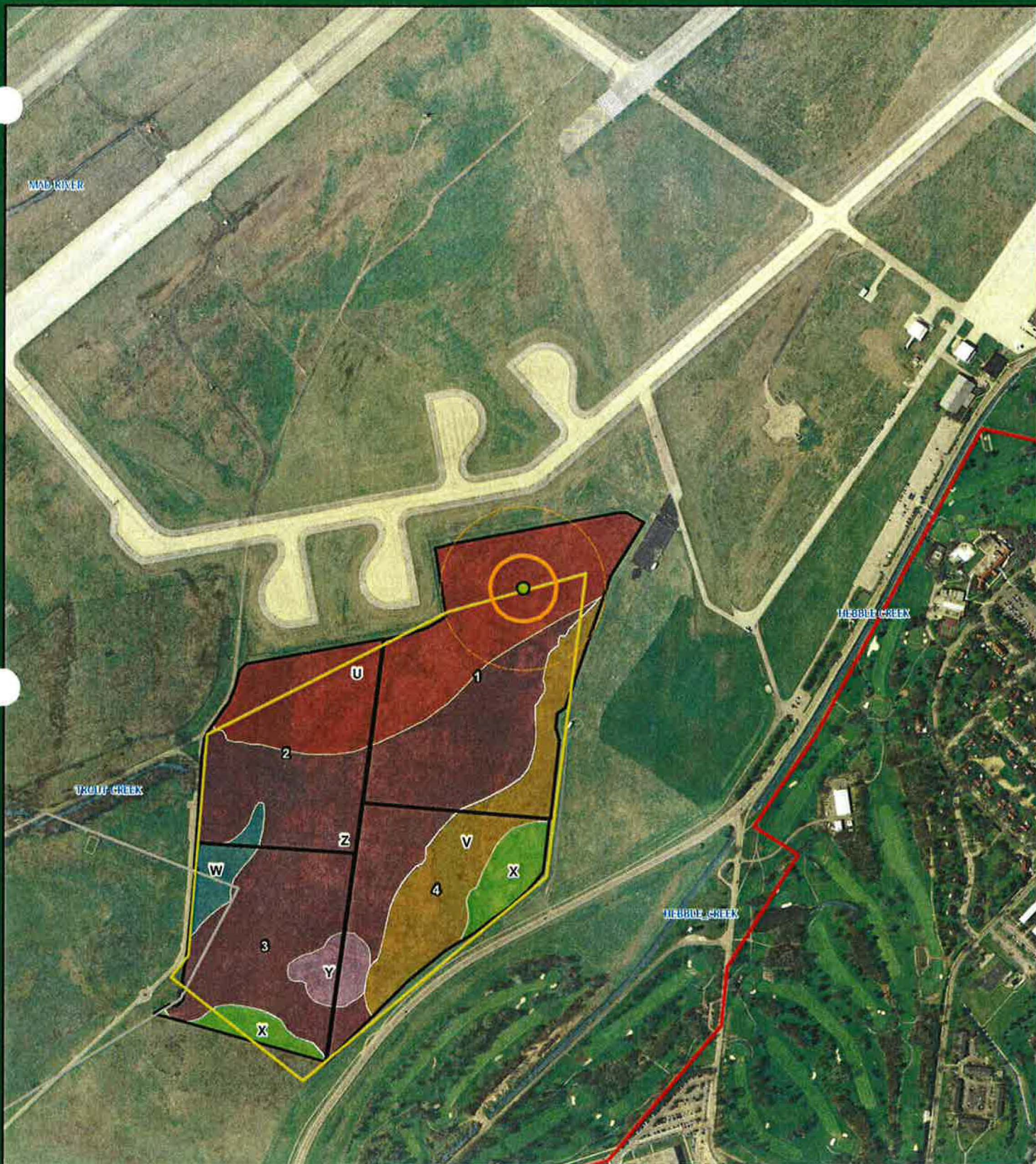


Figure 2.3.2
Approximate Transportation Route
Fort Knox EOD Range





3.2.1.1 Existing Vegetation Zones and Burn Units - Skel Avenue Site Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Ohio Natural Landmark
- Huffman Prairie Flying Field
- Huffman Prairie Burn Units
- Visitorway
- Detonation Structure Buffers
- Combustible Free Zone (200 ft)
- Clear Zone (500ft)

Huffman Prairie Vegetation Zones

- U
- V
- W
- X
- Y
- Z

NRC
Natural Resources Consulting, Inc.
208 Commerce Parkway
P.O. Box 128
College Grove, WI 53527-0128
phone: 608-838-1098
fax: 608-838-1095
www.nrcdifference.com

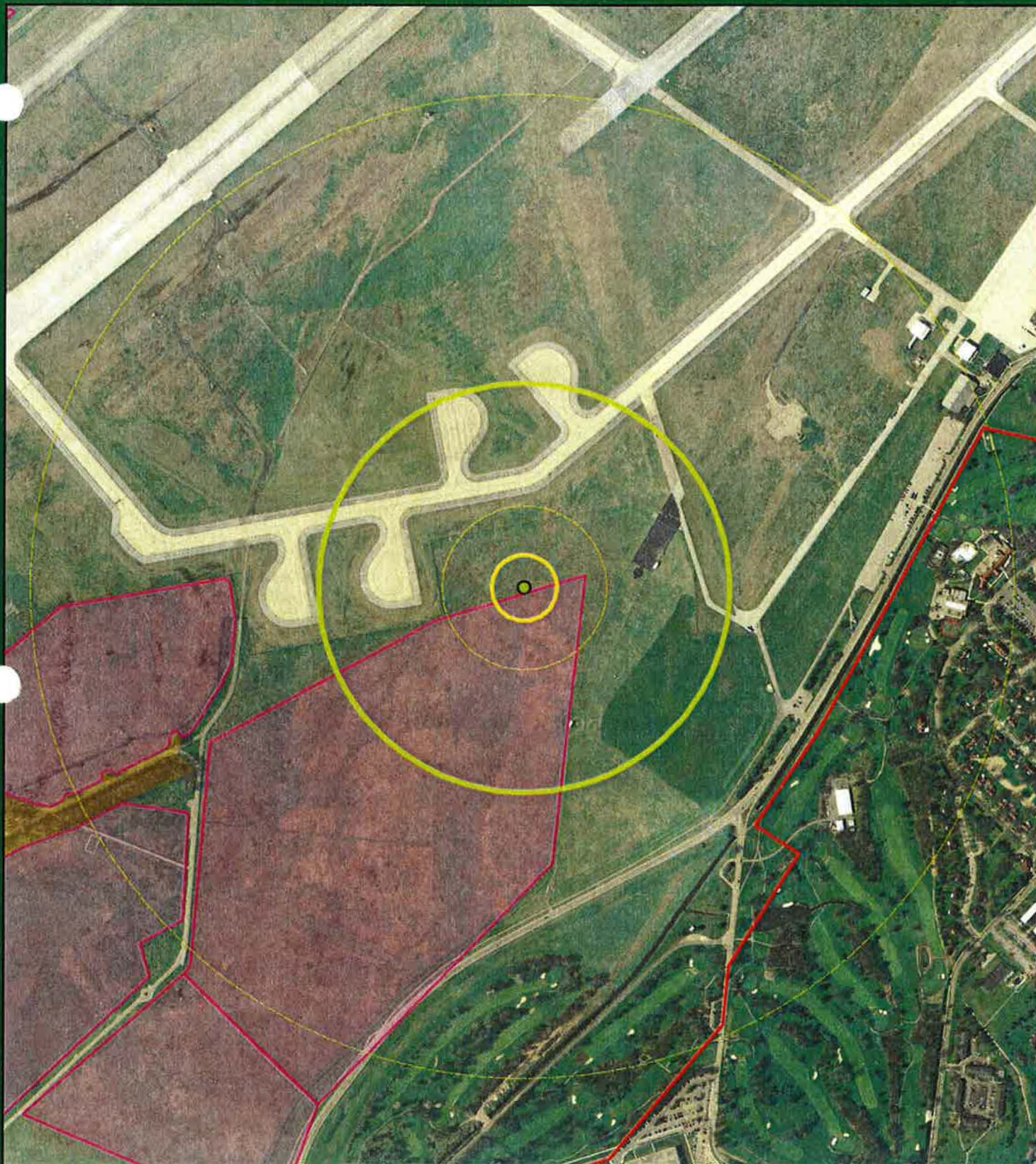


Figure 3.2.3.1a Projected Noise Contours and Potential Impacts - Skel Avenue Site
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

0 400 800 Feet

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Blazing Star Stem Borer
- Indiana Bat
- Detonation Structure Buffers
- Combustible Free Zone (200ft)
- Clear Zone (500ft)

Projected Noise Contours

- 136dB (unweighted peak)
- 129dB (unweighted peak)

NRC
Natural Resources Consulting, Inc.
200 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-838-1998
fax: 608-838-1995
www.nrcdifference.com

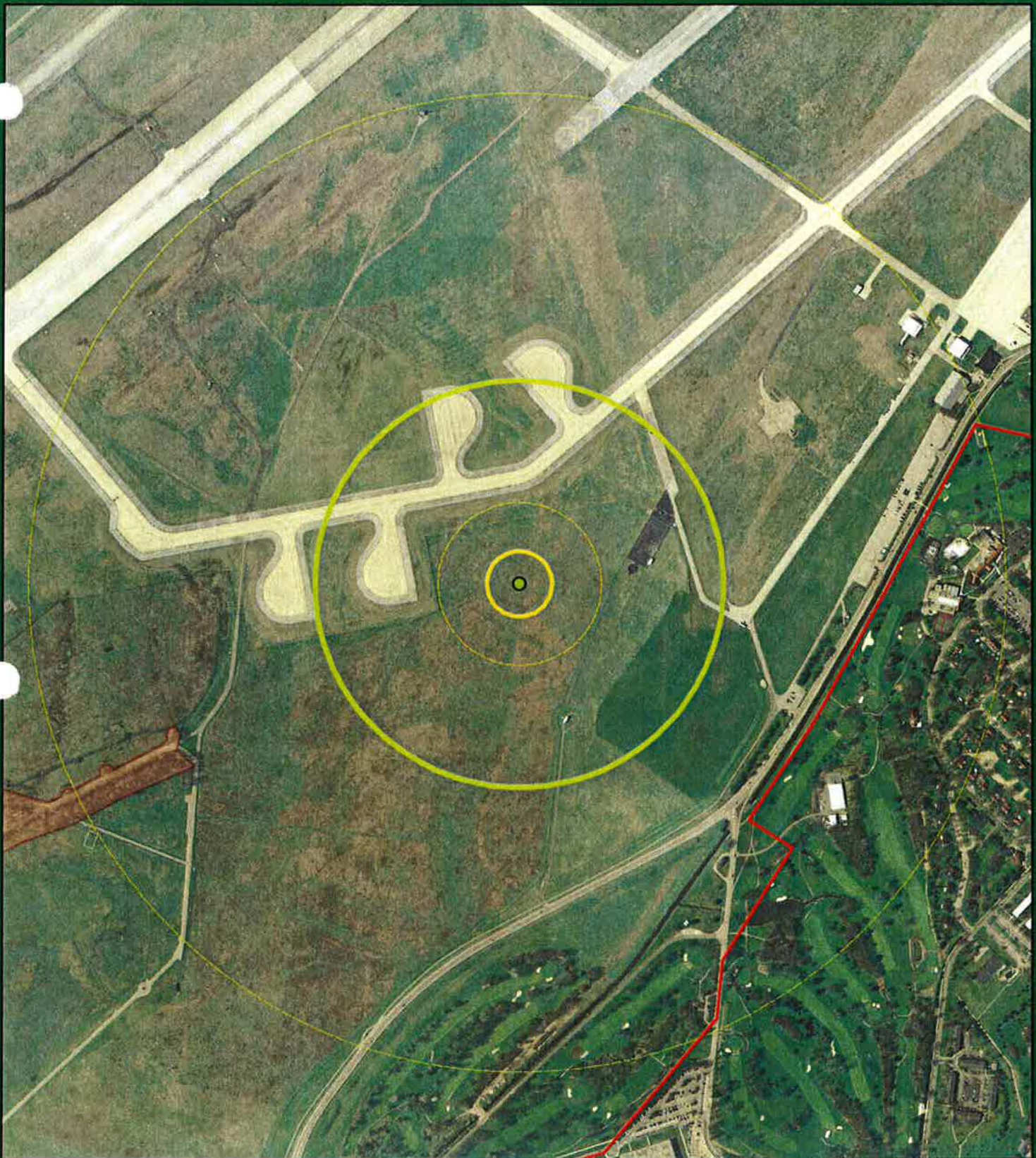


Figure 3.2.3.1b. Projected Noise Contours and Potential Impacts - Skel Avenue Site
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

0 400 800 Feet

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Bald Eagle
- Detonation Structure Buffers
- Combustible Free Zone (200ft)
- Clear Zone (500ft)

Projected Noise Contours

- 136dB (unweighted peak)
- 129dB (unweighted peak)

NRC
Natural Resources Consulting, Inc.
208 Commerce Parkway
P.O. Box 128
Collage Grove, WI 53527-0128
phone: 608-839-1898
fax: 608-839-1995
www.nrcdiffer.com



**Figure 3.2.3.2a Projected Noise Contours and Potential Impacts - Former EOD Site
Wright-Patterson Air Force Base**



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Clubshell Mussel
- Indiana Bat
- Detonation Structure Buffers
- Combustible Free Zone (200ft)
- Clear Zone (500ft)
- Projected Noise Contours
- 136dB (unweighted peak)
- 129dB (unweighted peak)

NRC
National Resources Consulting, Inc.

200 Commerce Parkway
P.O. Box 128
College Grove, WI 53527-0128
phone: 608-838-1998
fax: 608-838-1995
www.nrcdifference.com



Figure 3.2.3.2b Projected Noise Contours and Potential Impacts - Former EOD Site
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Bald Eagle
- Blazing Star Stem Borer
- Glade Mallow
- Pennywort
- Whorled Water Milfoil

Detonation Structure Buffers

- Combustible Free Zone (200ft)
- Clear Zone (500ft)

Projected Noise Contours

- 136dB (unweighted peak)
- 129dB (unweighted peak)

NRC
Natural Resources Consulting, Inc.
200 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1899
fax: 608-839-1995
www.nrcinc.com



**Figure 3.2.3.3a Projected Noise Contours and Potential Impacts - Hebble Creek Road Site
Wright-Patterson Air Force Base**



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Bald Eagle
- Blazing Star Stem Borer
- Glade Mallow
- Pennywort
- Whorled Water Milfoil

Detonation Structure Buffers

- Combustible Free Zone (200 ft)
- Clear Zone (500 ft)

Projected Noise Contours

- 136dB (unweighted peak)
- 129dB (unweighted peak)

NRC

Nature's Resources Consulting, Inc.
209 Commerce Parkway
P.O. Box 128
Ostrage Grove, WI 53527-0128
phone: 608-839-1999
fax: 608-839-1995
www.nrcdellaware.com



**Figure 3.2.3.3b Projected Noise Contours and Potential Impacts - Hebble Creek Road Site
Wright-Patterson Air Force Base**



Location
T08N, R02E
Greene County, OH

0 400 800 Feet

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Indiana Bat
- Eastern Massasauga Snake
- Detonation Structure Buffers
- Combustible Free Zone (200 ft)
- Clear Zone (500 ft)
- Projected Noise Contours
- 136dB (unweighted peak)
- 129dB (unweighted peak)

NRC

Nature's Resources Consulting, Inc.
208 Commerce Parkway
P.O. Box 120
Cottage Grove, WI 53527-0120
phone: 608-639-1998
fax: 608-639-1995
www.nrc-consulting.com

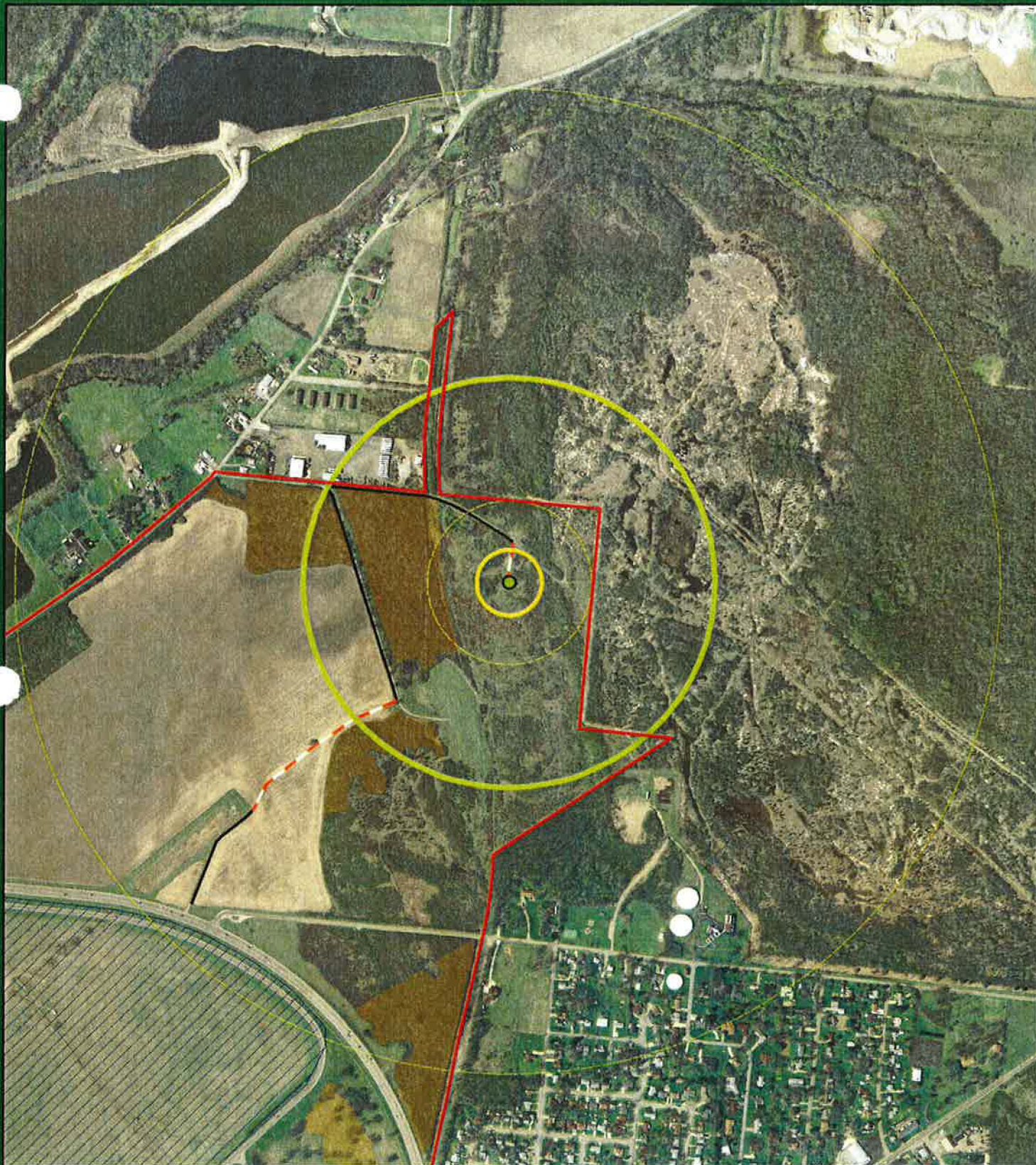


Figure 3.2.3.4a Projected Noise Contours and Potential Impacts – Sandhill Site
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Indiana Bat
- Upland Sandpiper
- Existing Road
- New Road

Detonation Structure Buffers

- Combustible Free Zone (200 ft)
- Clear Zone (500 ft)

Projected Noise Contours

- 136dB (unweighted peak)
- 129dB (unweighted peak)

NRC
Natural Resource Consulting, Inc.

200 Commerce Parkway
P.O. Box 128
Chillicothe, OH 43006-0128
phone: 608-438-1908
fax: 608-438-1995
www.nrcdifference.com

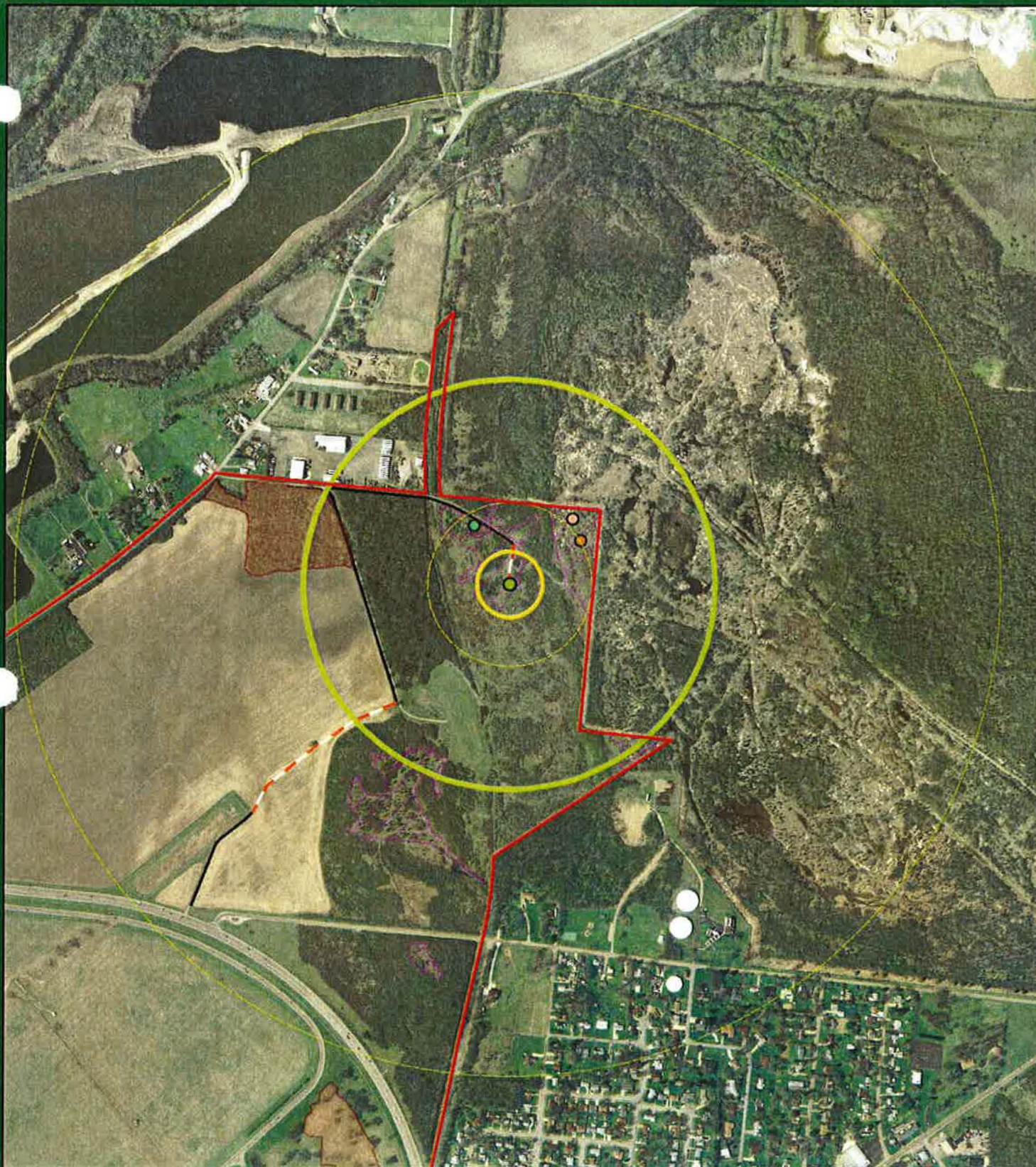


Figure 3.2.3.4b Projected Noise Contours and Potential Impacts - Sandhill Site
Wright-Patterson Air Force Base



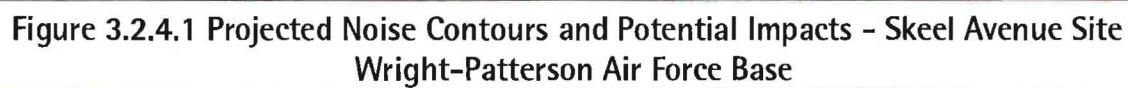
Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Bald Eagle
- Blazing Star Stem Borer
- Crow's Sedge
- Great Plain Ladies Tresses
- Western False Gromwell
- Existing Road
- New Road
- Detonation Structure Buffers
- Combustible Free Zone (200 ft)
- Clear Zone (500 ft)
- Projected Noise Contours
- 136dB (unweighted peak)
- 128dB (unweighted peak)

NRC
Natural Resources Consulting, Inc.
208 Commerce Parkway
P.O. Box 126
Collage Grove, WI 53527-0126
phone: 608-638-1808
fax: 608-638-1985
www.nrcdifference.com



Page 1 of 1



Figure 3.2.4.2 Projected Noise Contours and Potential Impacts - Former EOD Site
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

0 400 800 Feet

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Detonation Structure Buffers
 - Combustible Free Zone (200 ft)
 - Clear Zone (500 ft)
- Projected Noise Contours
 - 136dB (unweighted peak)
 - 129dB (unweighted peak)
- Wetland Area
- Environmental Restoration Site
- Soil Map Unit Area
- Aquifer Recharge Area
- Waterway

NRC
National Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Collage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.nrcillinois.com

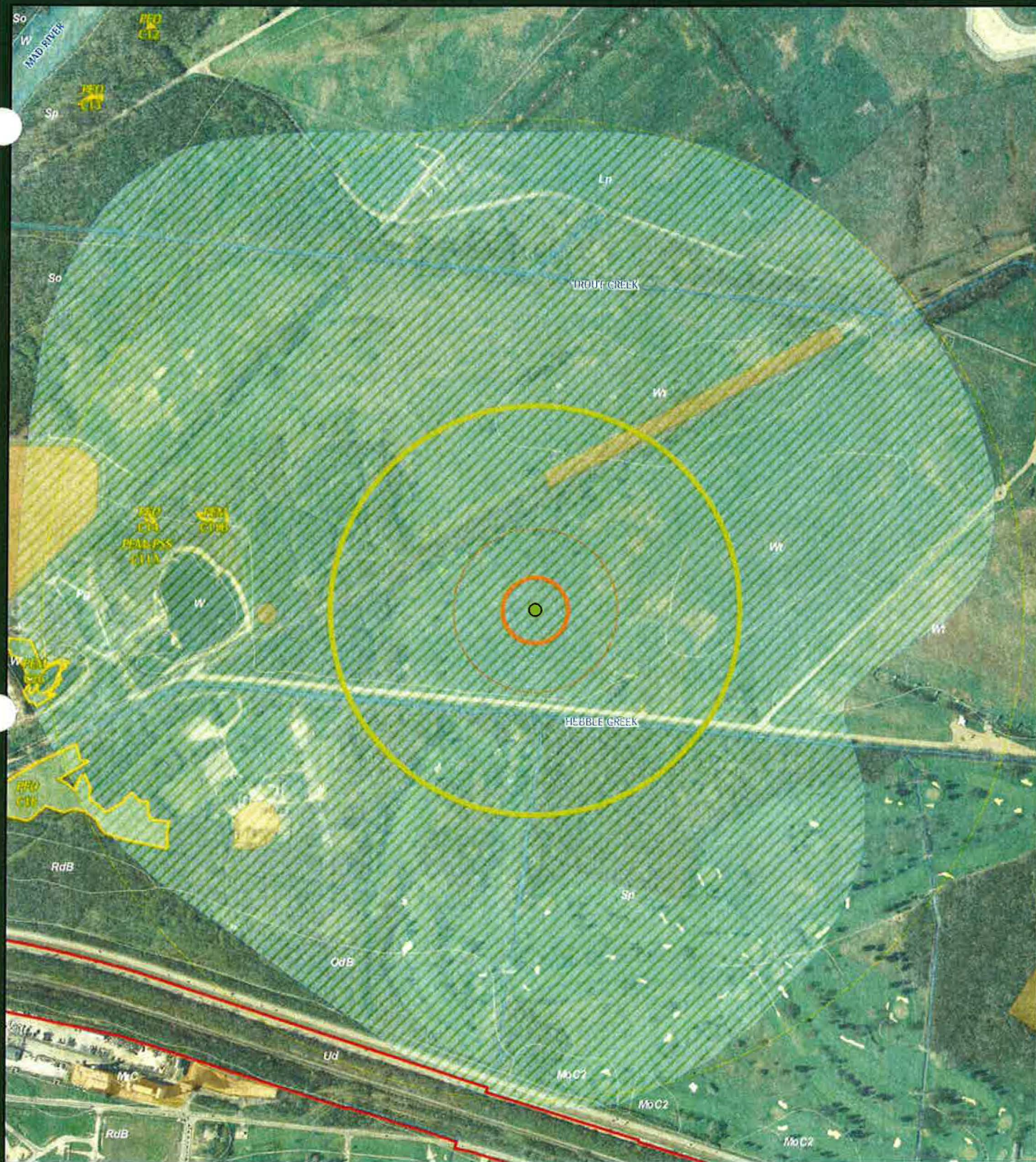


Figure 3.2.4.3 Projected Noise Contours and Potential Impacts - Hebble Creek Road Site
Wright-Patterson Air Force Base



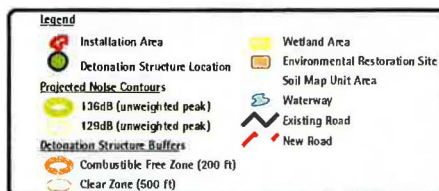
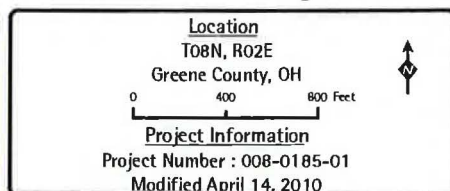
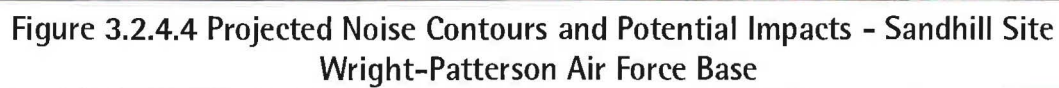
Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

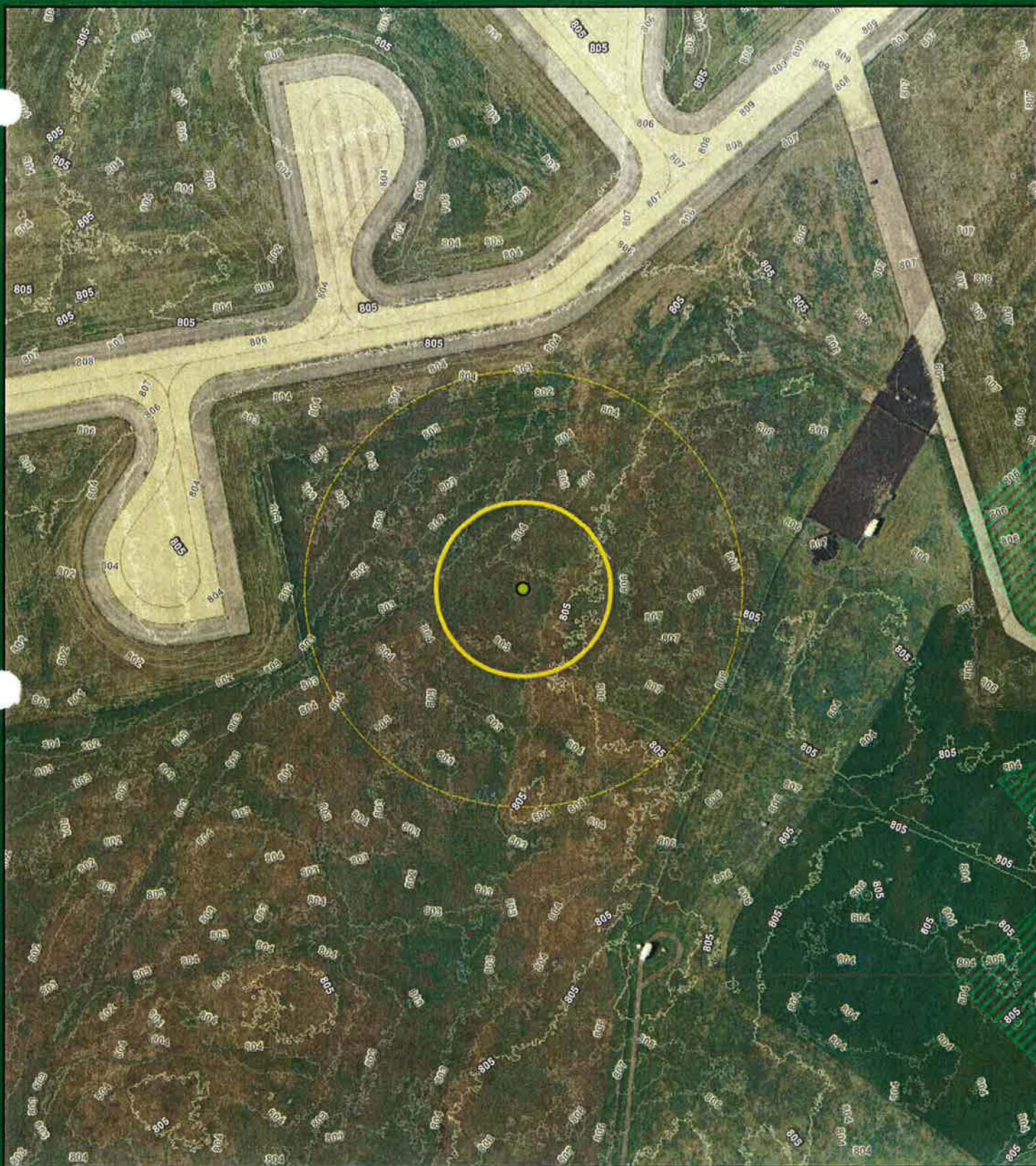
Legend

- Installation Area
- Detonation Structure Location
- Detonation Structure Buffers
 - Combustible Face Zone (200 ft)
 - Clear Zone (500 ft)
- Projected Noise Contours
 - 136dB (unweighted peak)
 - 129dB (unweighted peak)
- Wetland Area
- Environmental Restoration Site
- Soil Map Unit Area
- Aquifer Recharge Area
- Waterway

NRC
National Resource Center
200 Commerce Parkway
P.O. Box 121
Cottage Grove, WI 53527-0121
phone: 608-478-1990
fax: 608-879-1996
www.nrcdifference.com



Page 1 of 1



**Figure 3.3.2.1 Contour and Water Features - Skeel Avenue Site
Wright-Patterson Air Force Base**



Location
TO8N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

0 150 300 Feet

North Arrow

Legend

- Detonation Structure Location
- Major Contour
- Intermediate Contour
- Aquifer Recharge Area
- Detonation Structure Buffers
 - Combustible Free Zone (200ft)
 - Clear Zone (500 ft)
- Drinking Water Sample Point*
- Water Wdl Point*
- Waterway*

*Not Present in Data Frame

NRC
National Resources Consulting, Inc.

208 Commerce Parkway
P.O. Box 128
College Grove, IN 46207-0128
phone: 608-639-1088
fax: 608-639-1985
www.nrcdifference.com

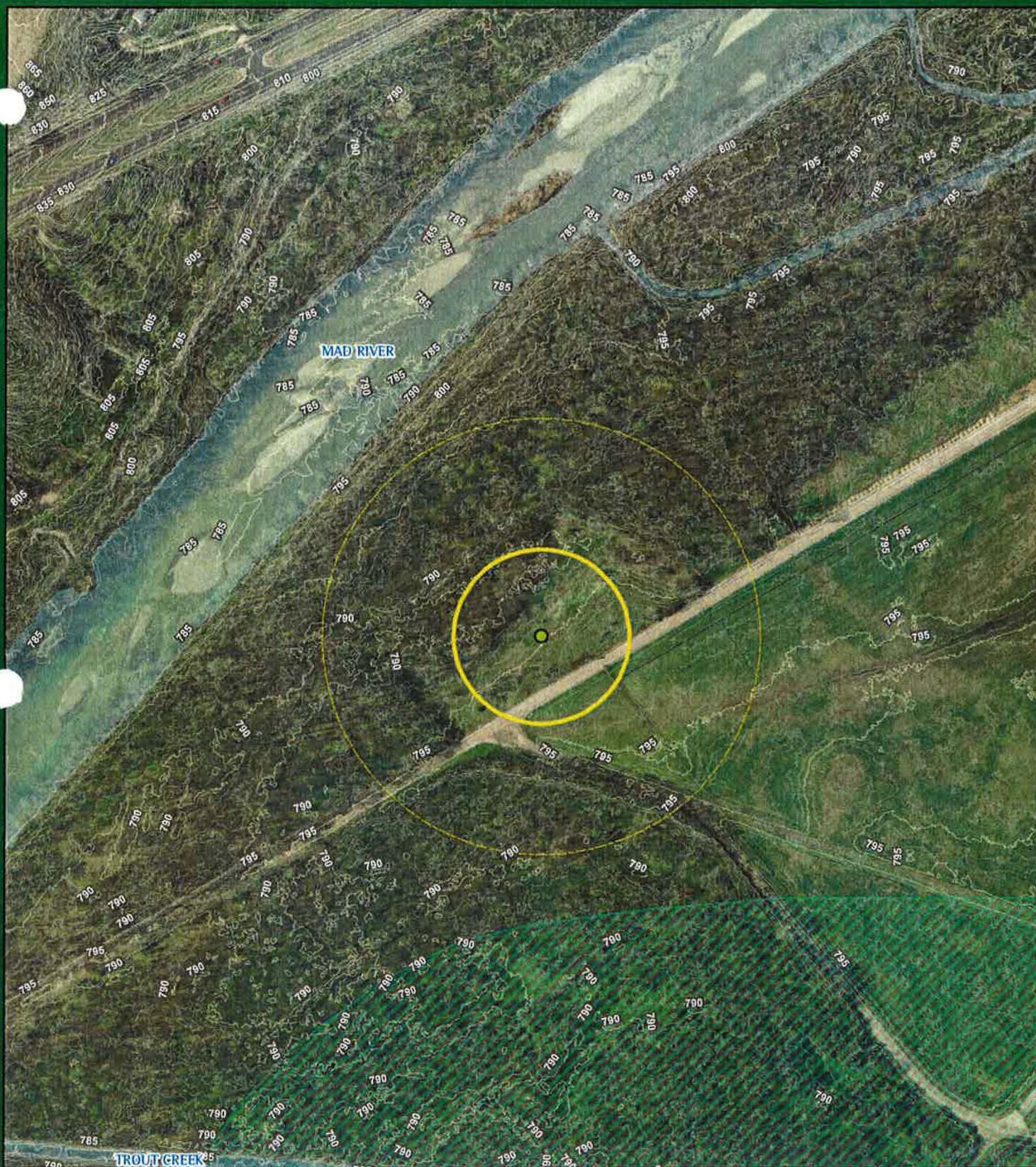


Figure 3.3.2.2 Contour and Water Features – Former EOD Site
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Detonation Structure Location
- Major Contour
- Intermediate Contour
- Aquifer Recharge Area
- Detonation Structure Buffers
- Combustible Free Zone (200ft)
- Clear Zone (500 ft)
- Drinking Water Sample Point*
- Water Well Point*
- Waterway

*Not Present in Data Frame

NRC
National Remediation Consulting, Inc.
208 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53537-0128
phone: 608-838-1998
fax: 608-838-1995
www.nrcwi.com

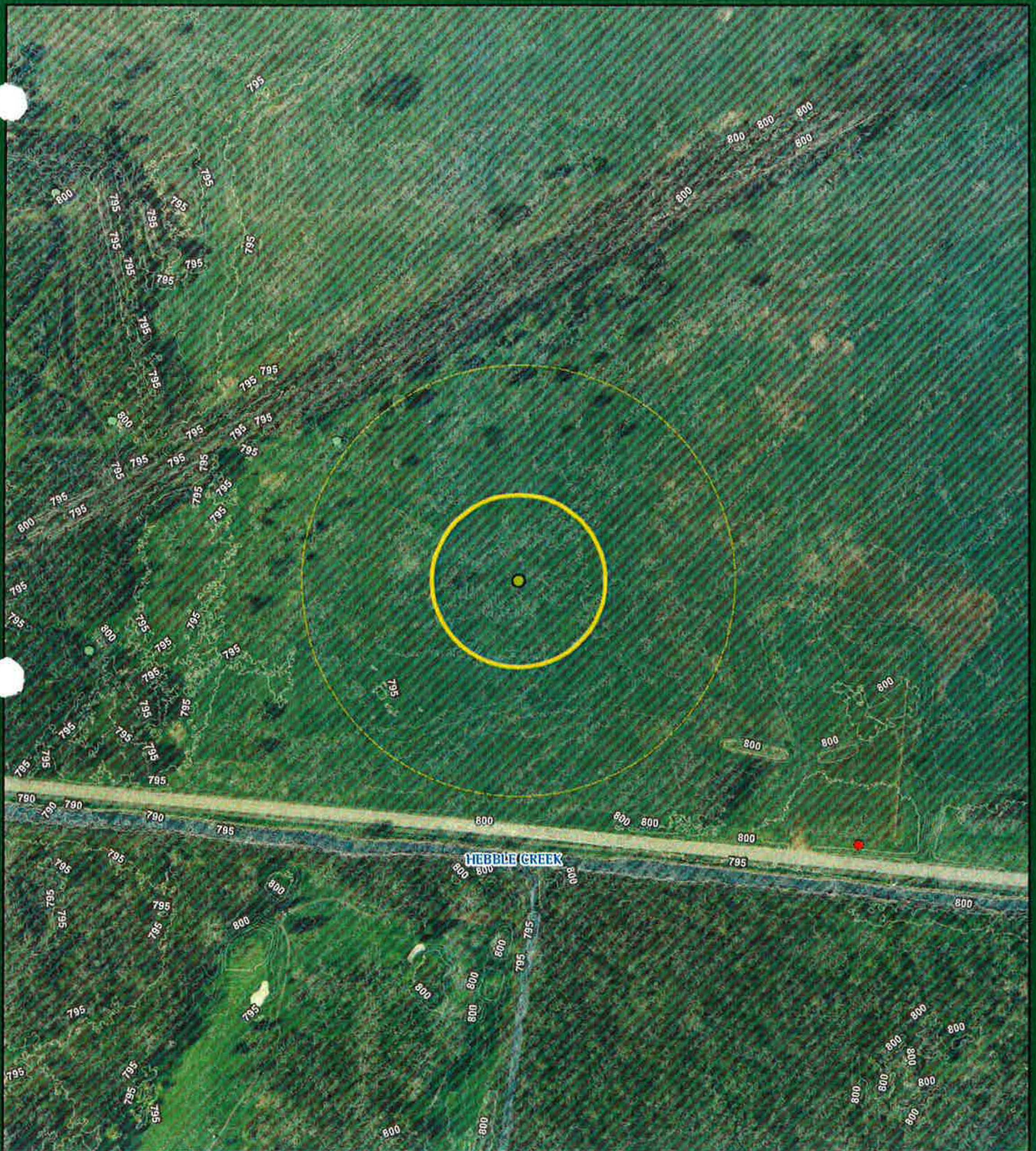


Figure 3.3.2.3 Contour and Water Features - Hebble Creek Road Site
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Detonation Structure Location
- Major Contour
- Intermediate Contour
- Aquifer Recharge Area
- Detonation Structure Buffers
- Combustible Free Zone (200ft)
- Clear Zone (500 ft)
- Drinking Water Sample Point
- Water Well Point
- Waterway

NRC
NORTHWESTERN CONSULTING, INC.
208 Commerce Parkway
P.O. Box 128
College Grove, WI 53627-0128
phone: 608-638-1908
fax: 608-638-1885
www.nrcdifferences.com



Figure 3.3.2.4 Contour and Water Features - Sandhill Site
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Detonation Structure Location
- Major Contour
- Intermediate Contour
- ▨ Aquifer Recharge Area
- Combustible Free Zone (200ft)
- Clear Zone (500 ft)
- Drinking Water Sample Point*
- Water Well Point*
- Waterway*

Detonation Structure Buffers

*Not Present in Data Frame

NRC
Natural Resources Consulting, Inc.
208 Commerce Parkway
P.O. Box 128
Ollage Grove, WI 53827-0128
phone 608-839-1998
fax 608-839-1995
www.nrcdifference.com



**Figure 3.9.1 Projected Noise Contours and Potential Impacts - Skeel Avenue Site
Wright-Patterson Air Force Base**



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Detonation Structure Buffers
 - Combustible Free Zone (200 ft)
 - Clear Zone (500ft)
- Projected Noise Contours
 - 136dB (unweighted peak)
 - 129dB (unweighted peak)
- Historic Feature Site
- Historic District
- Nature Trail
- Waterway

NRC
Natural Resources Consulting, Inc.
208 Commerce Parkway
P.O. Box 126
Chillicothe, OH 43006
phone: 608-439-1899
fax: 608-439-1985
www.nrc-difference.com



**Figure 3.9.3 Projected Noise Contours and Potential Impacts - Hebble Creek Road Site
Wright-Patterson Air Force Base**



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Detonation Structure Buffers
 - Combustible Free Zone (200 ft)
 - Clear Zone (500ft)
- Projected Noise Contours
 - 136dB (unweighted peak)
 - 129dB (unweighted peak)
- Historic Feature Site
- Historic District
- Waterway

NRC
National Resources Consulting, Inc.
209 Commerce Parkway
P.O. Box 128
Ottawa Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.nrcb-firm.com

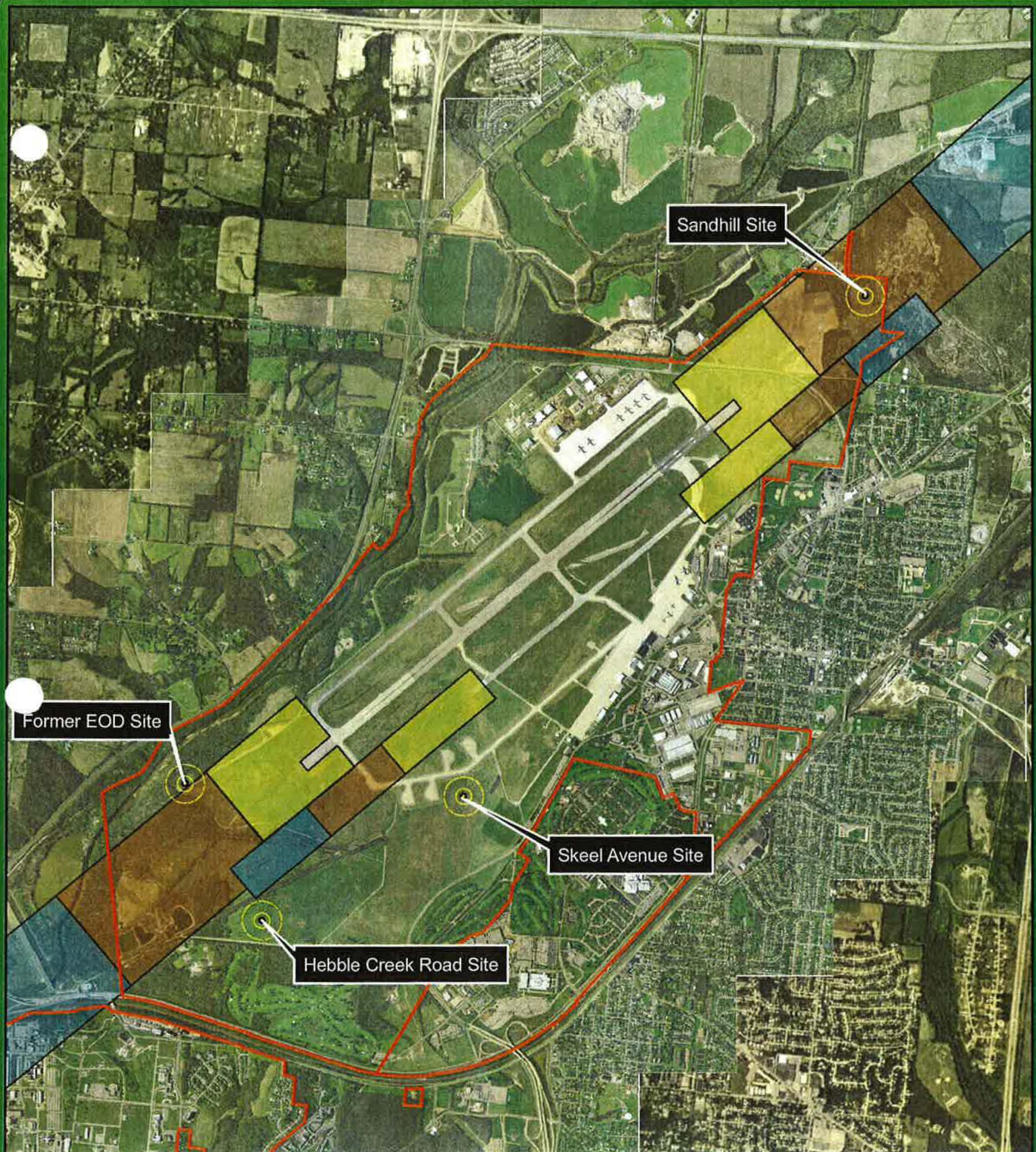


Figure 3.10. Control Zones
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

0 0.25 0.5 Miles

Project Information
Project Number : 008-0185-01
Modified March 25, 2009

Legend

- Installation Area
- Detonation Structure Location
- Detonation Structure Buffers
- Combustible Free Zone (200ft)
- Clear Zone (500ft)

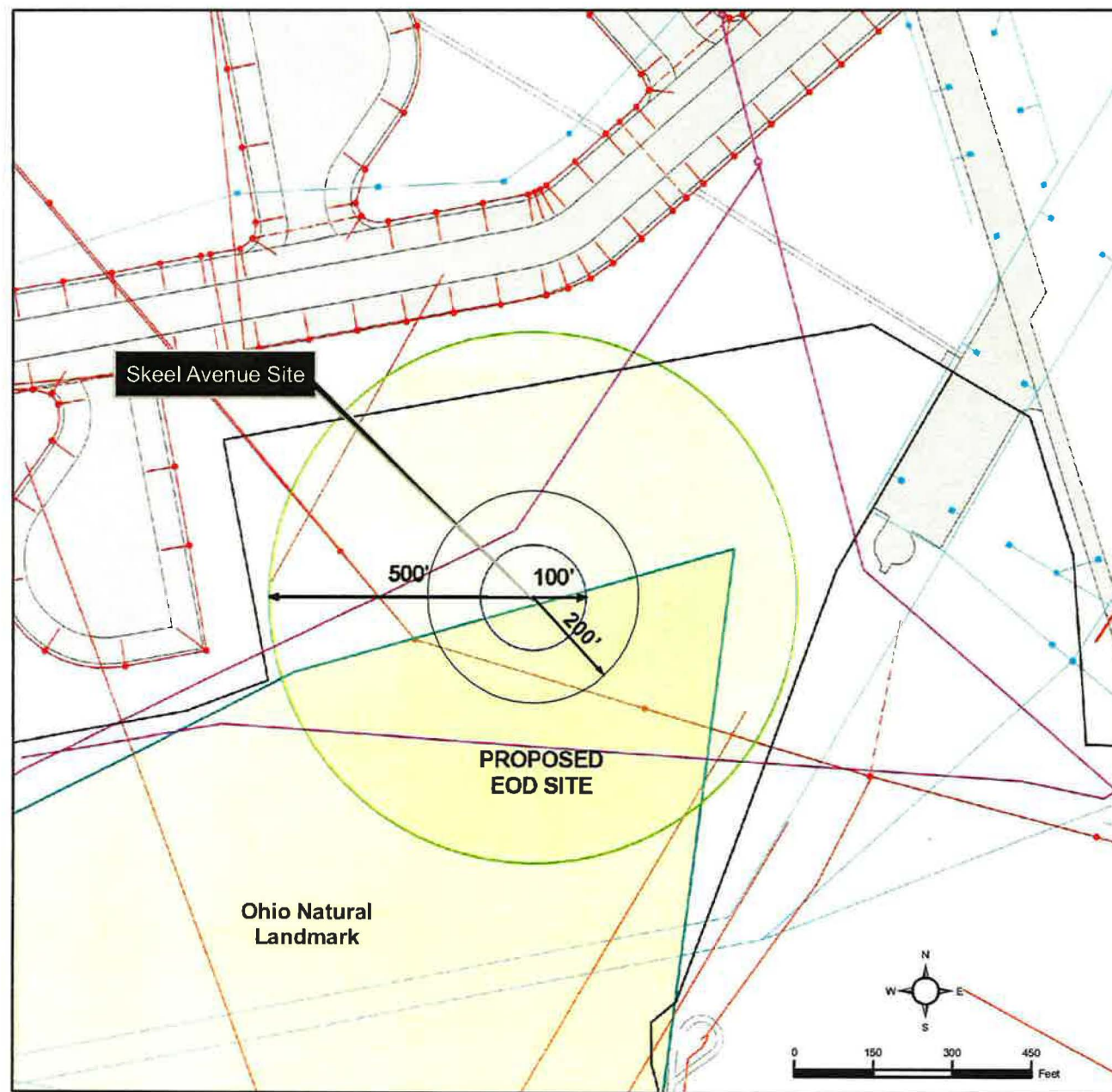
Control Zones

- Clear Zone
- APZ 1
- APZ 2

NRC
NATIONAL RESPONSE CONSULTING, INC.

209 Commerce Parkway
P.O. Box 126
Cottage Grove, WI 53527-0126
phone: 608-839-1998
fax: 608-839-1995
www.nrcdiff.com

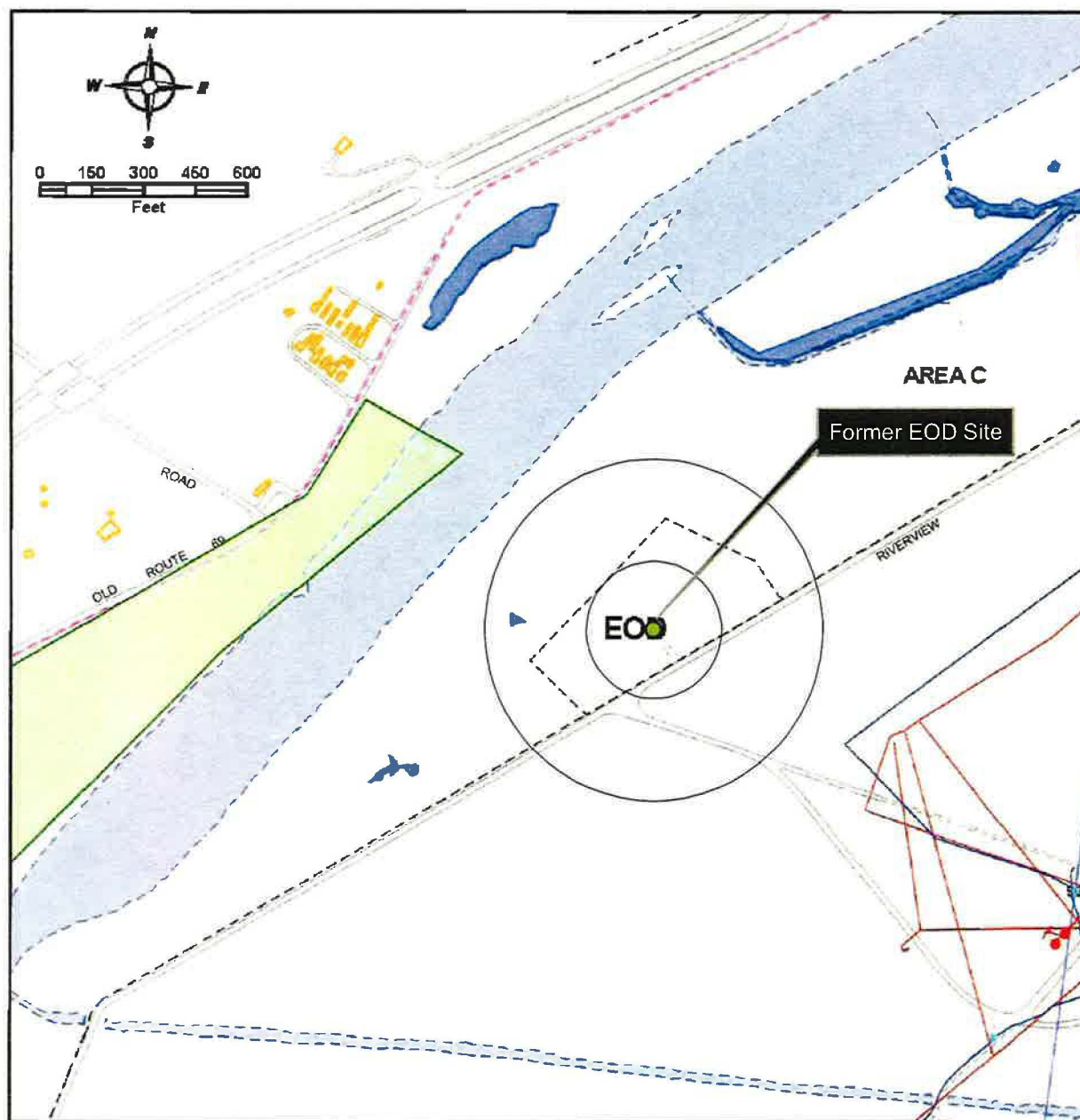
Figure 3.13a. Utilities
Wright-Patterson Air Force Base



Legend

-  AIRFIELD SURFACE AREA
-  BUILDING
-  COAXIAL LINE
-  COMM MANHOLE
-  ELECTRICAL CABLE LINE
-  ELECTRICAL DUCTBANK LINE
-  ELECTRICAL JUNCTION
-  EOD 100 FOOT RADIUS
-  EOD 500 FOOT RADIUS
-  FENCE
-  GOLF COURSE
-  HUFFMAN PRAIRIE
-  NATURAL GAS LINE
-  PAVED DRIVE, PARKING & ROAD
-  STORM SEWER CULVERT LINE
-  STORM SEWER INLET
-  STORM SEWER JUNCTION
-  STORM SEWER LINE
-  SURFACE WATER BODY AREA
-  SURFACE WATER COURSE AREA
-  SURFACE WATER COURSE CENTERLINE
-  SWIMMING POOL AREA
-  UNPAVED DRIVE AND ROAD
-  WASTEWATER INLET
-  WASTEWATER JUNCTION
-  WASTEWATER LINE
-  WATER HYDRANT
-  WATER JUNCTION
-  WATER LINE
-  WPAFB INSTALLATION BOUNDARY

Figure 3.13b. Utilities
Wright-Patterson Air Force Base



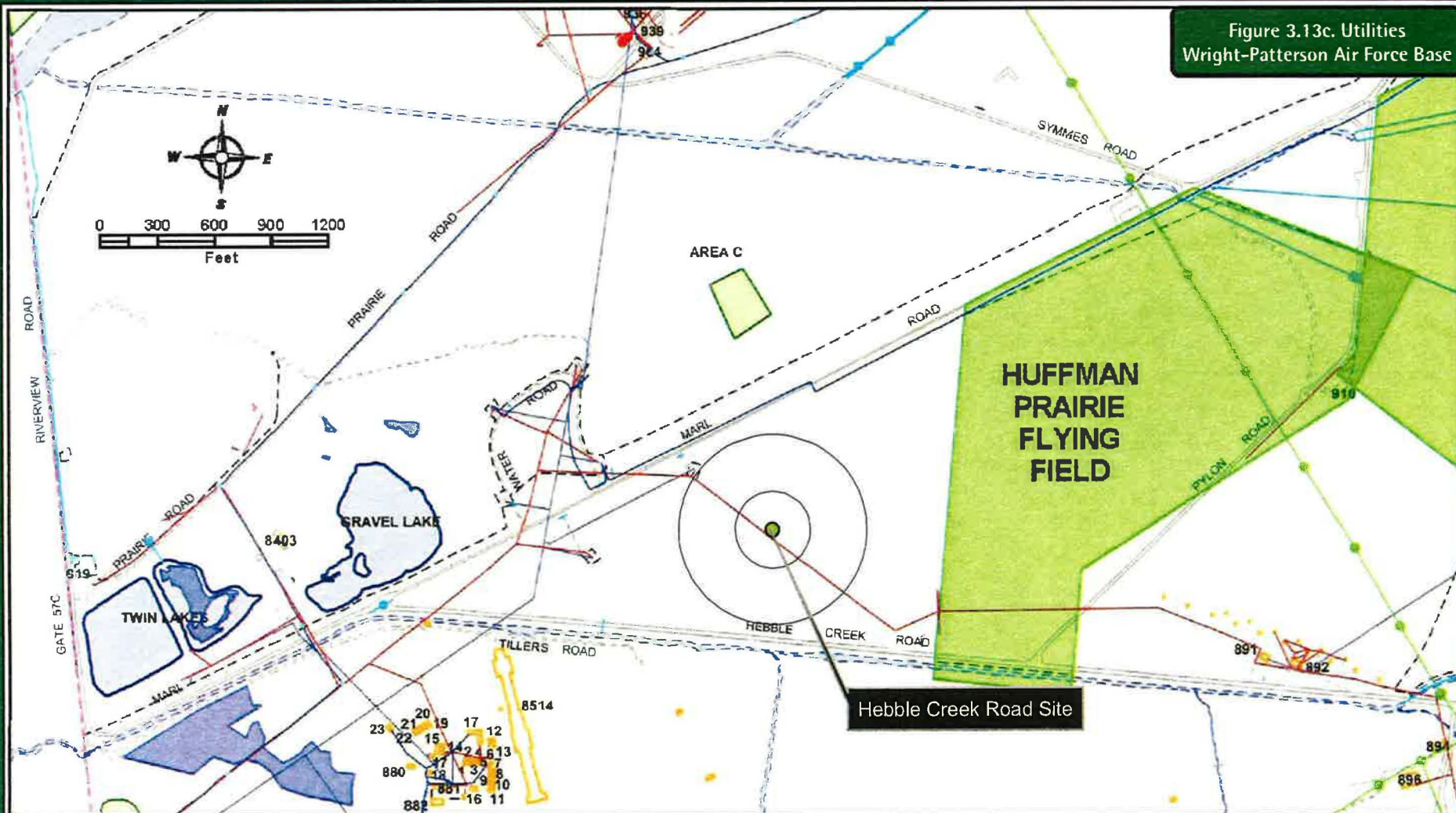
Legend

- AIRFIELD
- ARCHAEOLOGICAL SITE
- BASE BOUNDARY
- BUILDINGS
- COMM JUNCTION
- COMM PATH
- ELEC. SUBSTATION AREA
- ELECTRICAL CABLE LINE
- ELECTRICAL DUCTBANK LINE
- ELECTRICAL JUNCTION
- FENCE
- FUEL JUNCTION
- FUEL LINE
- HEAT/COOL JUNCTION
- HEAT/COOL LINE
- HISTORIC FEATURE SITE
- NATURAL GAS JUNCTION
- NATURAL GAS LINE
- OIL/WATER SEPARATOR
- PAVED DRIVES, PARKING, & ROADS
- SANITARY INLET
- SANITARY JUNCTION
- SANITARY LINE
- STORM INLET
- STORM JUNCTION
- STORM LINE
- SURFACE WATER BODY AREA
- SURFACE WATER COURSE AREA
- SURFACE WATER COURSE CL
- UNPAVED DRIVES, PARKING, AND ROADS
- WATER JUNCTION
- WATER LINE
- WETLAND AREA

AUGUST 2008

FOR OFFICIAL USE ONLY

Figure 3.13c. Utilities
Wright-Patterson Air Force Base



28 AUGUST 2008

Legend

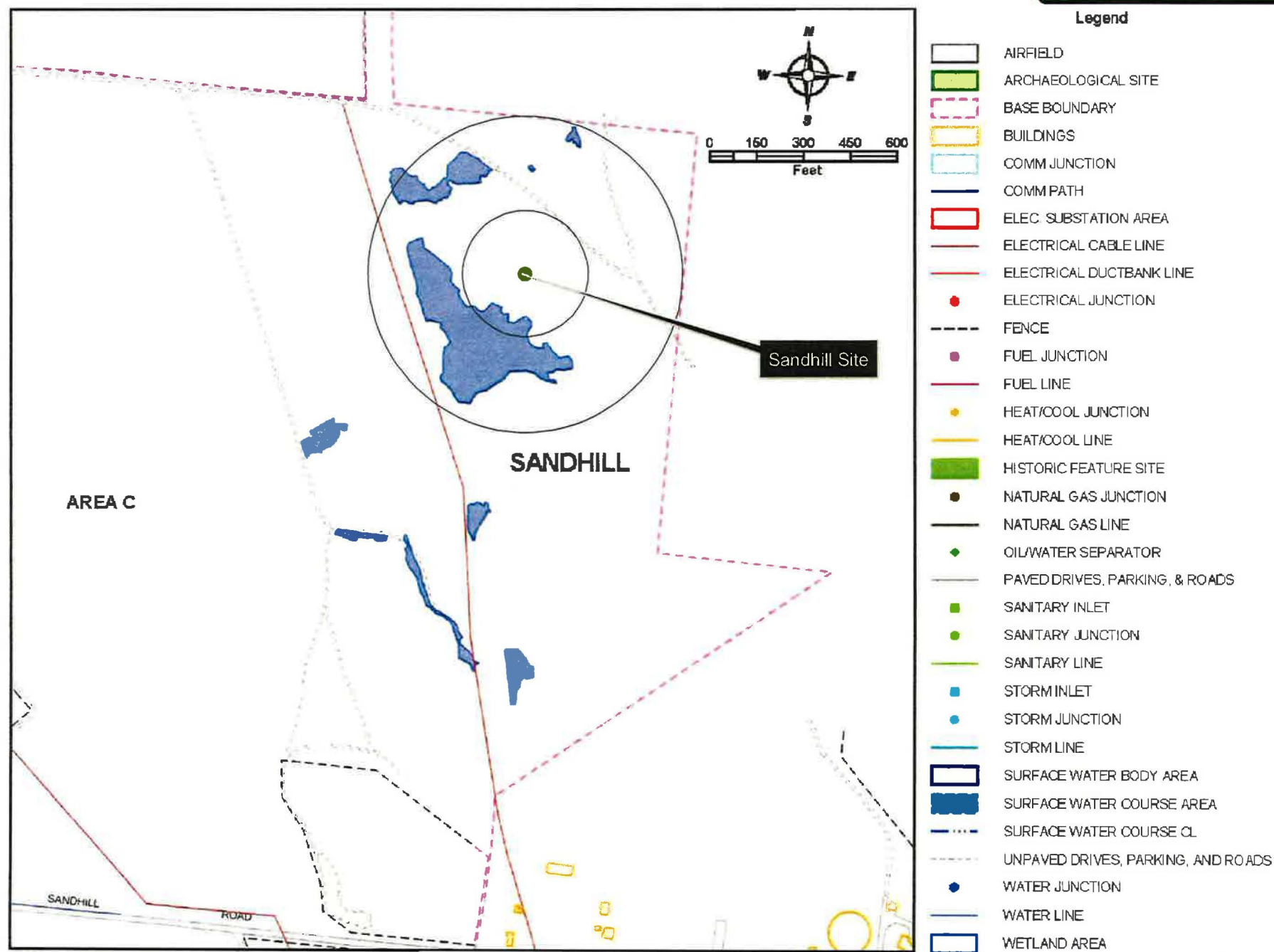
FOR OFFICIAL USE ONLY

	AIRFIELD		ELECTRICAL JUNCTION		NATURAL GAS LINE		STORM LINE
	ARCHAEOLOGICAL SITE		FENCE		OIL/WATER SEPARATOR		SURFACE WATER BODY AREA
	BASE BOUNDARY		FUEL JUNCTION		PAVED DRIVES, PARKING, & ROADS		SURFACE WATER COURSE AREA
	BUILDINGS		FUEL LINE		SANITARY INLET		SURFACE WATER COURSE CL
	COMM JUNCTION		HEAT/COOL JUNCTION		SANITARY JUNCTION		UNPAVED DRIVES, PARKING, AND ROADS
	COMM PATH		HEAT/COOL LINE		SANITARY LINE		WATER JUNCTION
	ELEC SUBSTATION AREA		HISTORIC FEATURE SITE		STORM INLET		WATER LINE
	ELECTRICAL CABLE LINE		NATURAL GAS JUNCTION		STORM JUNCTION		WETLAND AREA
	ELECTRICAL DUCTBANK LINE						

The information provided in this map document is advisory and is intended for reference purposes only.

WPAFB Utilities.mxd Map Created by D. Giblin

Figure 3.13d. Utilities
Wright-Patterson Air Force Base



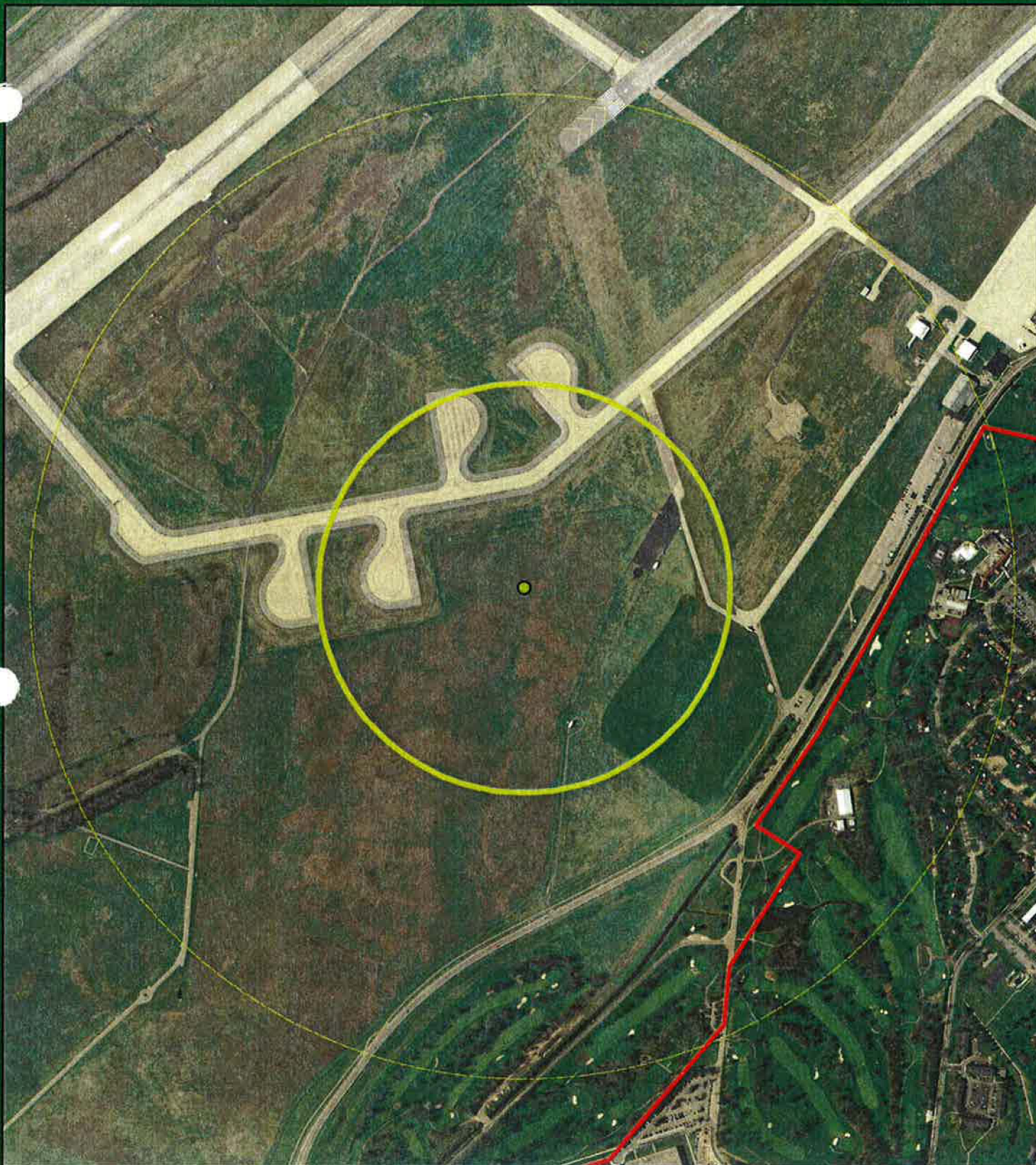


Figure 4.9.1 Orthophotography and Projected Noise Contours - Skeel Avenue Site
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Projected Noise Contours
 - 136dB (unweighted peak)
 - 129dB (unweighted peak)

NRC
Natural Resources Consulting, Inc.

200 Commerce Parkway
P.O. Box 128
Ottawa, Ontario, Canada K1H 8T8
Phone: 613-833-1980
Fax: 613-833-1985
www.nrcbfrance.com

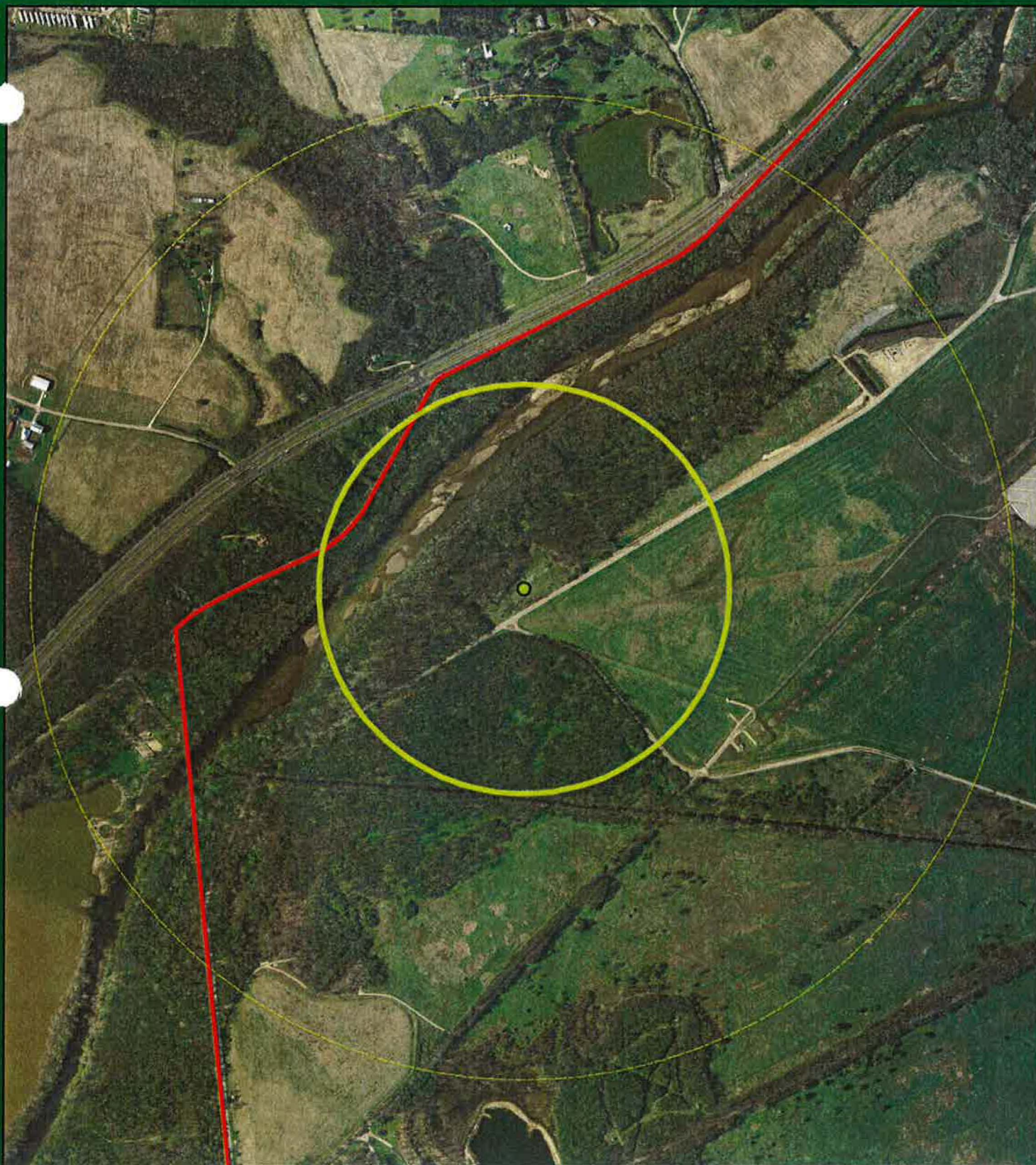


Figure 4.9.2 Orthophotography and Projected Noise Contours - Former EOD Site
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Projected Noise Contours
 - 136dB (unweighted peak)
 - 129dB (unweighted peak)

NRC
Natural Resources Consulting, Inc.

208 Commerce Parkway
P.O. Box 128
College Grove, WI 53527-0128
phone: 608-838-1998
fax: 608-838-1095
www.nrcillwaukee.com



Figure 4.9.3 Orthophotography and Projected Noise Contours - Hebble Creek Road Site
Wright-Patterson Air Force Base



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Projected Noise Contours
 - 136dB (unweighted peak)
 - 129dB (unweighted peak)

NRC
Natural Resources Consulting, Inc.

206 Commerce Parkway
P.O. Box 128
College Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.nrcwi.com



**Figure 4.9.4 Orthophotography and Projected Noise Contours – Sandhill Site
Wright-Patterson Air Force Base**



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified April 14, 2010

Legend

- Installation Area
- Detonation Structure Location
- Projected Noise Contours**
- 136dB (unweighted peak)
- 129dB (unweighted peak)

NRC
Natural Resources Consulting, Inc.
209 Commerce Parkway
P.O. Box 128
College Grove, WI 53527-0128
phone: 608-838-1998
fax: 608-838-1995
www.nrcdifference.com

APPENDIX A

CONSULTATION LETTERS

US Fish and Wildlife Service **1**

Ohio Department of Natural Resources **2**

National Parks Service **3**

Ohio Historic Preservation Office **4**

Ohio Environmental Protection Agency **5**

Other Correspondence **6**

7

8

US Fish and Wildlife Service

Date	Nature of Correspondence	Consultation Issues				Outcome
		Sandhill Site	Former EOD Site	Hebble Creek Road Site	Skeel Avenue Site	
9/23/08; 10/16/08; 3/9/09 (Skeel Ave)	WPAFB Consultation Request	Formal request for consultation on Alternatives 1 - 3			Addition of Skeel Avenue to consultation request	
3/18/2009	FWS Response	1) Indiana bat habitat present; 2) project within range of the eastern massasauga rattler-recommend yearly assessment of presence of habitat within project area; 3) Request site visit to more fully assess potential impacts.				Incomplete
4/7/2009	WPAFB Consultation Request	1) Submittal of Draft EA to USFWS; 2) FWS visit to WPAFB				
5/6/2009	FWS Response	1) Skeel Ave Site is preferred location of FWS due to the fact that existing surrounding development makes it the least suitable habitat for the rattler				Incomplete
12/31/08; 1/7/09; 3/4/09; 3/16/09 6/1/09; 7/22/09	WPAFB Consultation Request (e-mail)	1) Additional site details provided by WPAFB via e-mail 12/31/08 - 3/16/09; 2) Request clarification on 5/6/09 response from FWS;				
6/1/2009	FWS Response (e-mail)	FWS responded that Determination of Effect is required to complete consultation on rattler species				Incomplete
7/2/09; 8/5/09	WPAFB Consultation Request	Submitted Determination of Effect requesting concurrence that EOD activities at the Skeel Avenue site will not adversely affect the species listed in the FWS 3/18/09 response letter				Incomplete

US Fish and Wildlife Service

Date	Nature of Correspondence	Consultation Issues				Outcome
		Sandhill Site	Former EOD Site	Hebble Creek Road Site	Skeel Avenue Site	
7/22/2009	WPAFB Consultation Request (e-mail)	Requested consultation on arrival of nesting eagle pair south of Area C and transmitted ODNR comments on eagles to FWS				
7/22/2009	FWS Response (e-mail)	No foreseeable impacts from nesting pair; recommended contacting ODNR for further consultation				Consultation w/FWS unnecessary for this species
8/13/2009	FWS Response	FWS concurs that Indiana bat, clubshell mussel and snuffbox are not of concern; Proposed alternative does not have suitable habitat for rattlers and is the most suitable location for the EOD development in FWS opinion; construction, burns and mowing limited to Nov.1 - March 1; mow no closer than 8" above ground; consultation complete w/concurrence that project is unlikely to adversely affect snake populations				Consultation Complete
9/1/2009	WPAFB Consultation Request	WPAFB requests deviation from Nov. 1 - March 1 limitations outlined in FWS 8/13/09 letter; proposed limiting construction activities to minimal levels except during the winter months and re-scheduling burns to Oct 1 - Mar 30				
9/25/2009	WPAFB Consultation Request	Amend 9/1/09 request for schedule changes for burns from Oct 20 - Mar 15 and clarified reasons for request of extended construction schedule				
10/2/2009	FWS Response	Agreed to revised construction schedule proposed in 9/25/09 request provided that area was mowed prior to construction on overcast days of temperatures either <65 or greater than 80 degrees F; recommend conducting burns on or after Oct 30, but did not object to extending burn schedule to Mar 15; acknowledged compliance with time frames is voluntary				Consultation Complete

9/23/08; 10/16/08; 3/9/09 (Skeel Ave)

WPAFB Consultation Request



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

23 September 2008

88 ABW/CEVY
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Dr. Mary Knapp
U.S Department of Interior
Fish & Wildlife Service
6950 Americana Pkwy, Suite H
Reynoldsburg, OH 43068-4127

Subject: Section 7 Endangered Species
Environmental Assessments
Wright Patterson AFB
Greene County, Ohio

Dear Dr. Knapp:

Wright-Patterson AFB is preparing two Environmental Assessments for two projects designed to support training efforts on the base.

The first EA will evaluate the proposed construction and operation of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range. The proposed locations for the EOD range are

- I. Former EOD range (Area C of WPAFB)
- II. Property north of Hebble Creek Road and west of the Huffman Prairie Flying Field (Area C of WPAFB); and
- III. Sand Hill (north of Area C of WPAFB).

The second EA will evaluate the proposed National Air and Space Intelligence Center (NASIC) and the U.S. Air Force School of Aerospace Medicine Expeditionary Medical Support (USAFSAM EMEDS) field training activities at the former Aircraft Battle Damage and Repair (ABDR) Facility site.

Attachment 1 provides mapped locations of the alternatives considered. Known locations of wetlands and potential endangered species habitats in the vicinity of the alternative site locations are provided in Attachment 2.

As part of these assessments, we are seeking informal consultation with the Fish and Wildlife Service in compliance with Section 7 of the Endangered Species Act in support of the projects designed to support training efforts at WPAFB.

The first EA (1), EOD operation, involves providing proficiency training to EOD personnel. At worst case this involves 2 days/week, 4 hours/day of training. The four hours involve setting up/training for the detonation of explosive materials (maximum explosive material detonated is five pounds C4 at one time). The actual detonation/explosion takes less than one second. The "clear" zone around the detonation site is a 500 ft radius. The detonations will be performed inside a walled containment barrier, most likely concrete. On an emergency basis only, this site will also be used to detonate unexploded ordnance that

come from the base or also from the public; this is a random occurrence with a frequency of maybe once/month. This project would involve constructing a precast concrete barrier six feet tall, approximately 46 feet long x 24 feet wide, with two open entrances. Two smaller barriers (approximately 6 feet long x 6 feet wide x 4 feet high) to contain tools and explosive materials, and a gravel access road and parking area would also be constructed. See Attachment 3 for examples of the barriers.

The second EA (2) involves utilizing the existing facility of the former ABDR, and minor site improvements for mobile medical facility training. Only personnel and portable equipment, such as generators and medical equipment, would be used at this site.

Thank you for your consideration. Please return your comments to me at the above address. If you have any questions, please contact me at (937) 257-0177 or by email at Raymond.Baker@wpafb.af.mil.

Sincerely



RAYMOND F. BAKER
Chief, Quality Branch
Environmental Management Division

cc: Jeff Jones/ Tetra Tech:

Attachments:

1. USGS Quadrangle Map
2. Wetlands and Endangered Species Habitat Map
3. Barrier Photos and Drawing

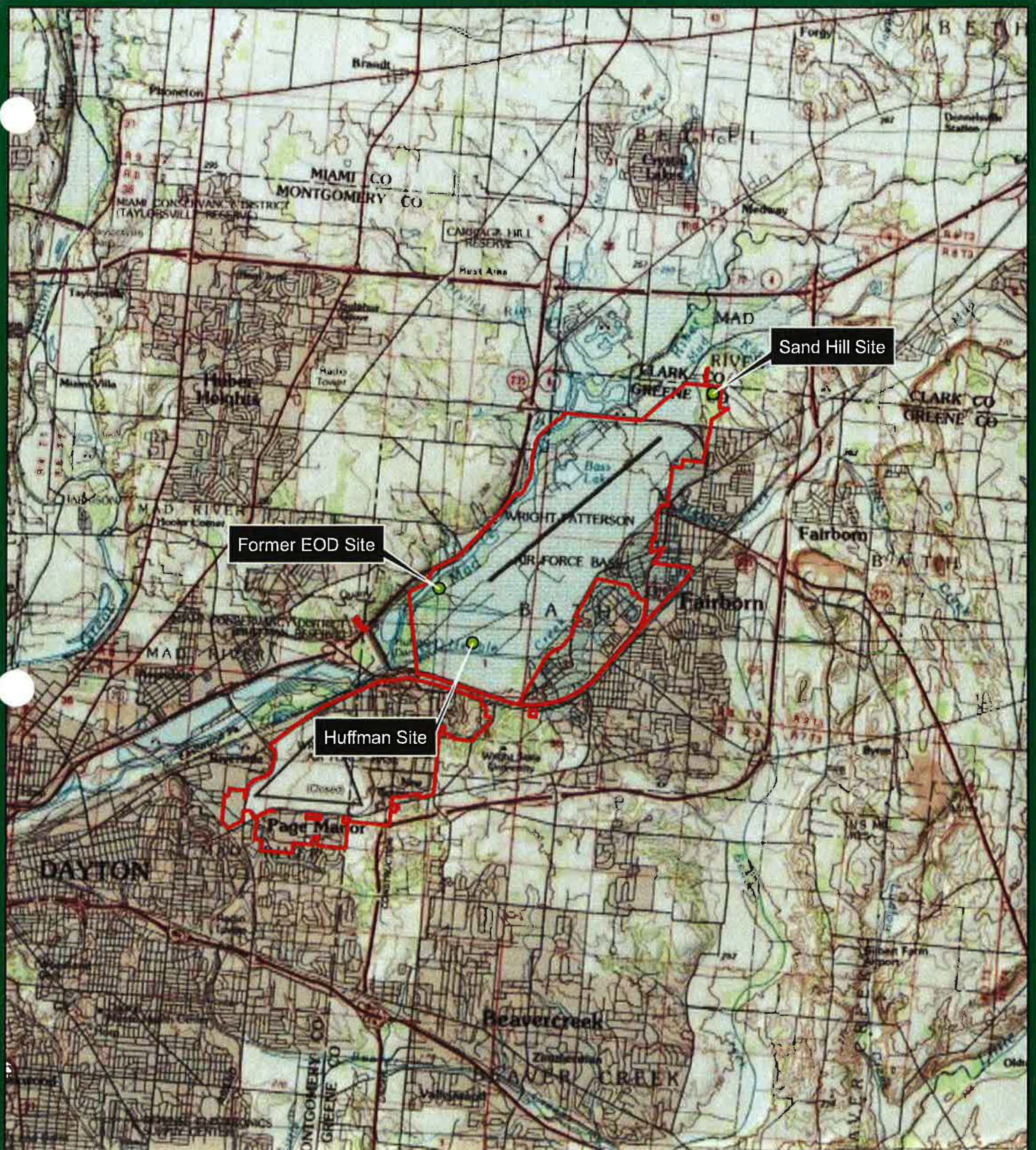


Figure 1. Project Location and Topography
Wright-Patterson Air Force Base

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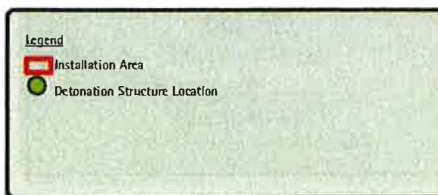
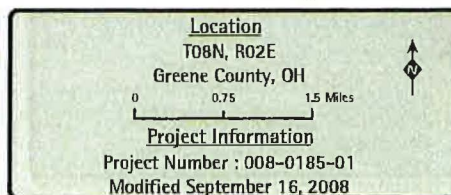




Figure 2. Environmental Features
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Wetland Area
- Environmental Restoration Site
- Soil Map Unit Area
- Waterway

NRC
National Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1908
fax: 608-839-1595

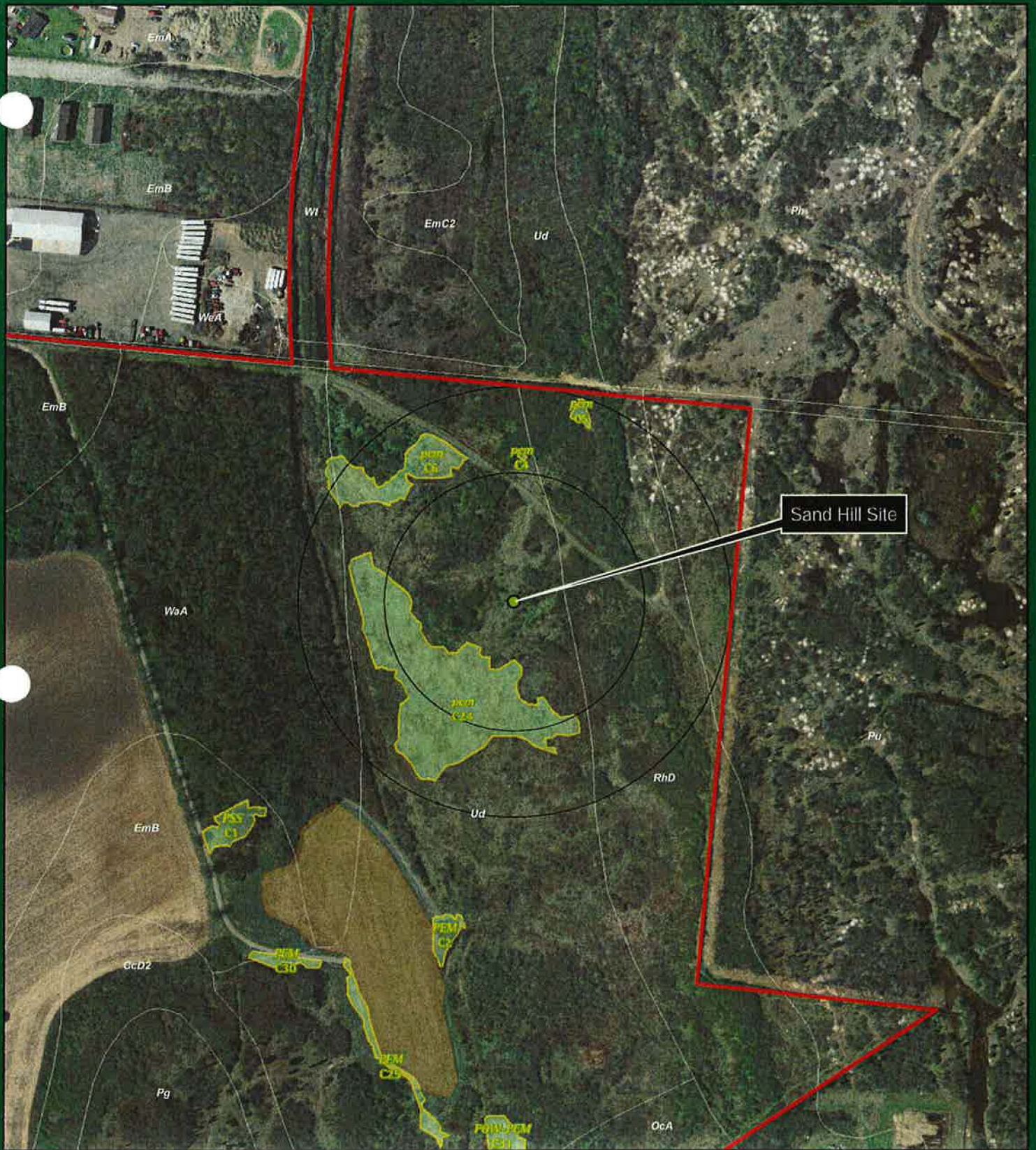


Figure 2. Environmental Features
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
TO8N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Wetland Area
- Environmental Restoration Site
- Soil Map Unit Area
- Waterway

NRC
Natural Resources Consulting, Inc.

205 Commerce Parkway
P.O. Box 128
College Grove, WI 53527-0128
phone: 608-839-1888
fax: 608-839-1885

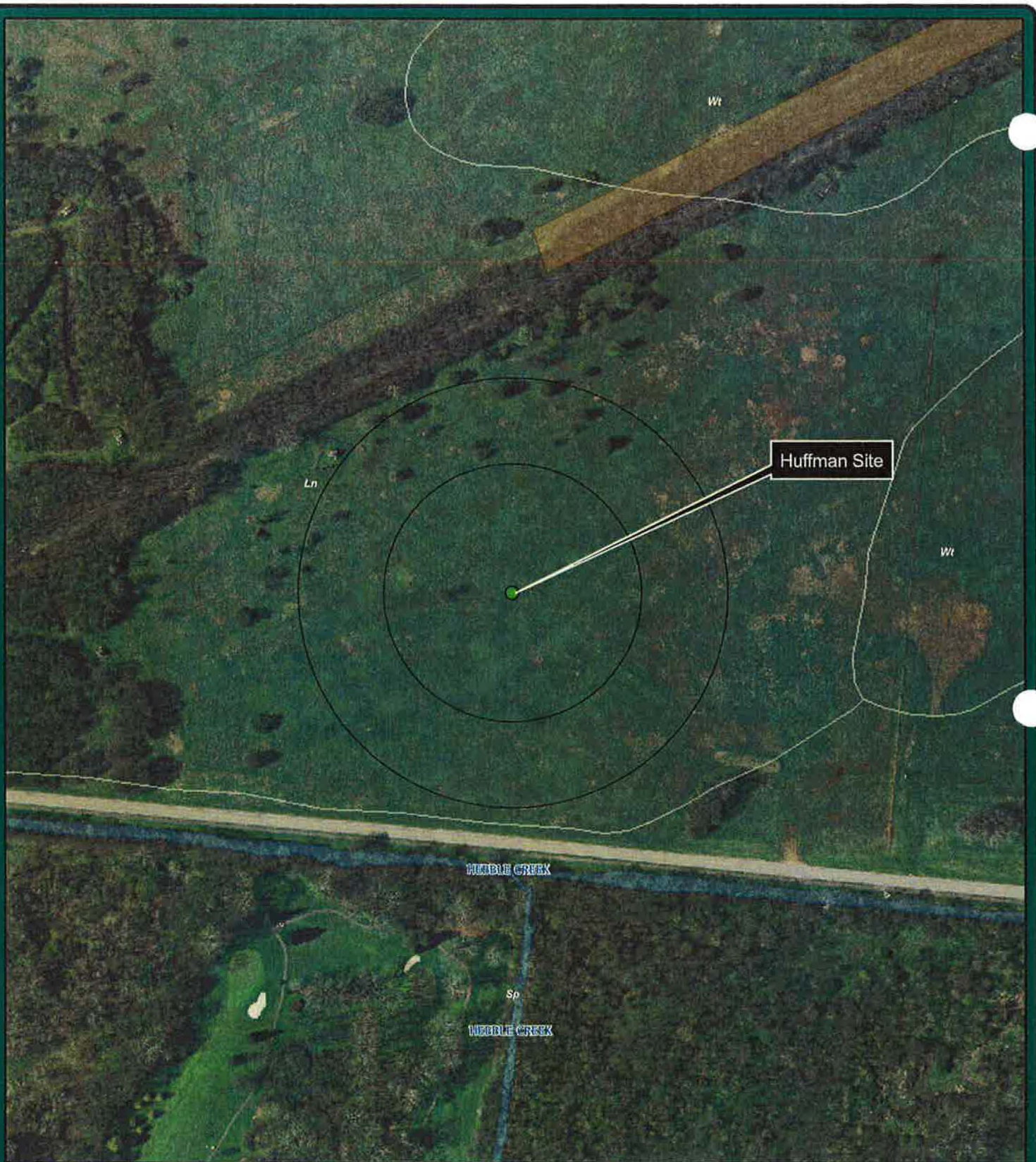
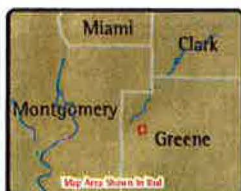


Figure 2. Environmental Features
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Wetland Area
- Environmental Restoration Site
- Soil Map Unit Area
- Waterway

NRC
Nuclear Resource Consulting, Inc.

204 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995



Figure 3a. Threatened and Endangered Species Occurrences
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

Installation Boundary	Clubshell
Detonation Structure Location	Indiana Bat
Detonation Structure Buffer (300 and 600 ft)	Upland Sandpiper
Rare Plants	East. Massasauga Snake
Bald Eagle	Waterway
Blazing Star Stem Borer	

NRC
National Resources Council

268 Commons Parkway
P.O. Box 128
College Grove, WI 53527-0128
phone: 608-839-1908
fax: 608-839-1995

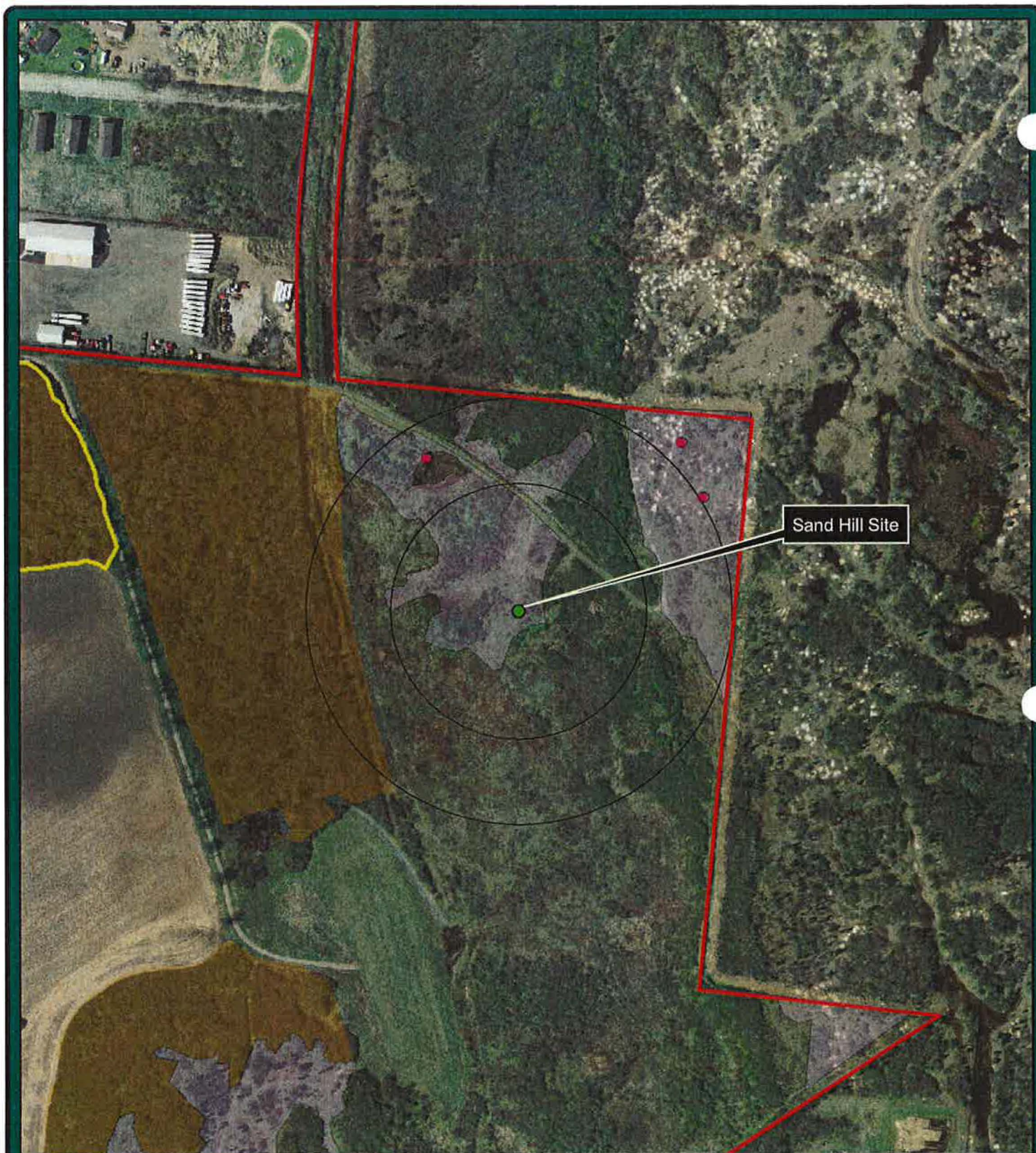


Figure 3a. Threatened and Endangered Species Occurrences
Wright-Patterson Air Force Base

CONFIDENTIAL



Location
TOBN, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

Installation Boundary	Clubshell
Detonation Structure Location	Indiana Bat
Detonation Structure Buffer (300 and 600 ft)	Upland Sandpiper
Rare Plants	East. Massasauga Snake
Bald Eagle	Waterway
Blazing Star Stem Borer	

NRC
Natural Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995



Figure 3a. Threatened and Endangered Species Occurrences
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

Installation Boundary	Clubshell
Detonation Structure Location	Indiana Bat
Detonation Structure Buffer (300 and 600 ft)	Upland Sandpiper
Rare Plants	East. Massasauga Snake
Bald Eagle	Waterway
Blazing Star Stem Borer	

NRC

National Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-835-1995



Figure 3b. Threatened and Endangered Species Habitat
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Blnd Habitat Area
- Waterway

NRC
Natural Resources Consulting, Inc.
200 Countryside Parkway
P.O. Box 128
Cottage Grove, WI 53127-0128
phone: 608-838-1898
fax: 608-838-1895



Figure 3b. Threatened and Endangered Species Habitat
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Blind Habitat Area
- Waterway

NRC
National Resource Consulting, Inc.
208 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995

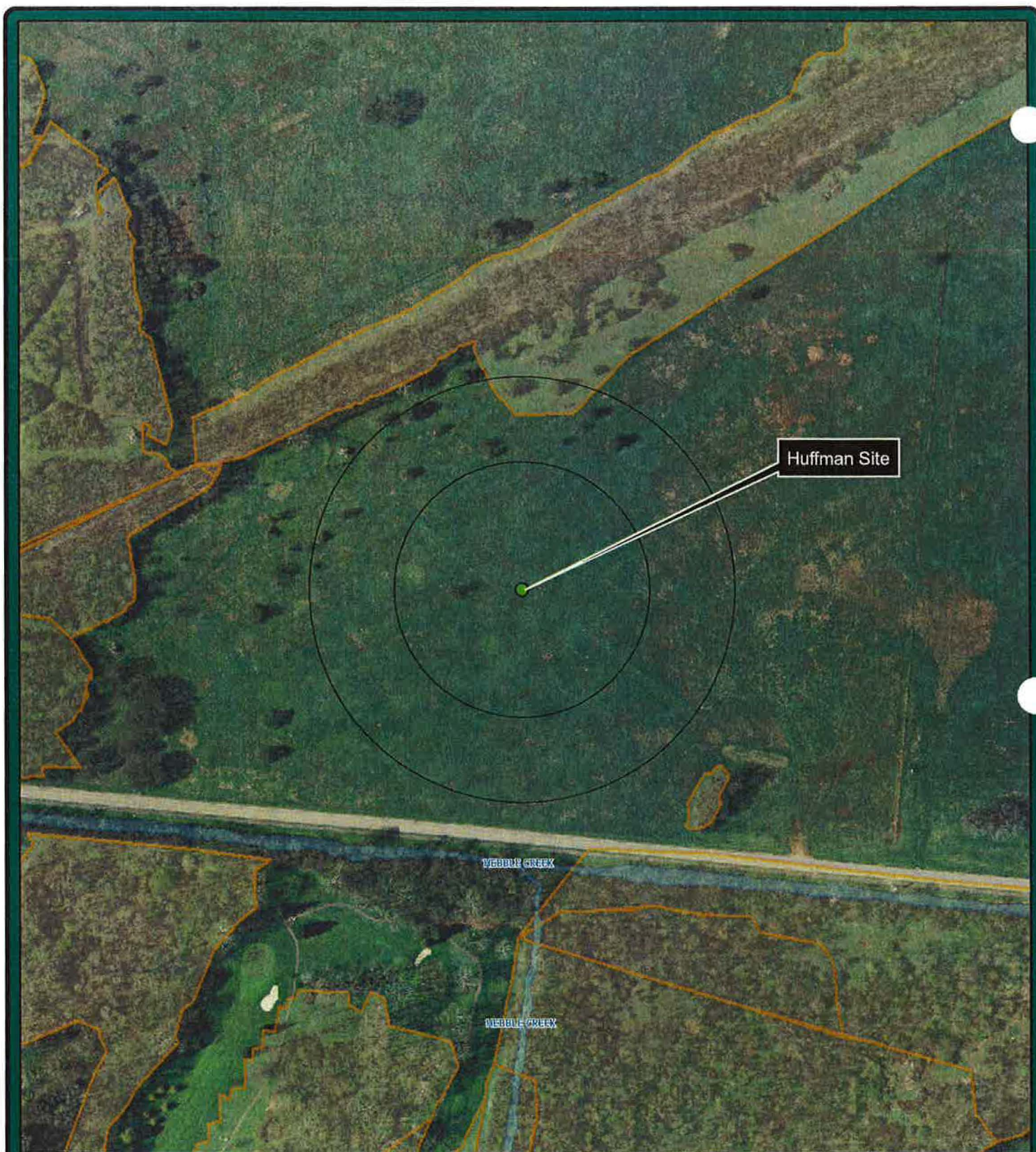


Figure 3b. Threatened and Endangered Species Habitat
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Bird Habitat Area
- Waterway

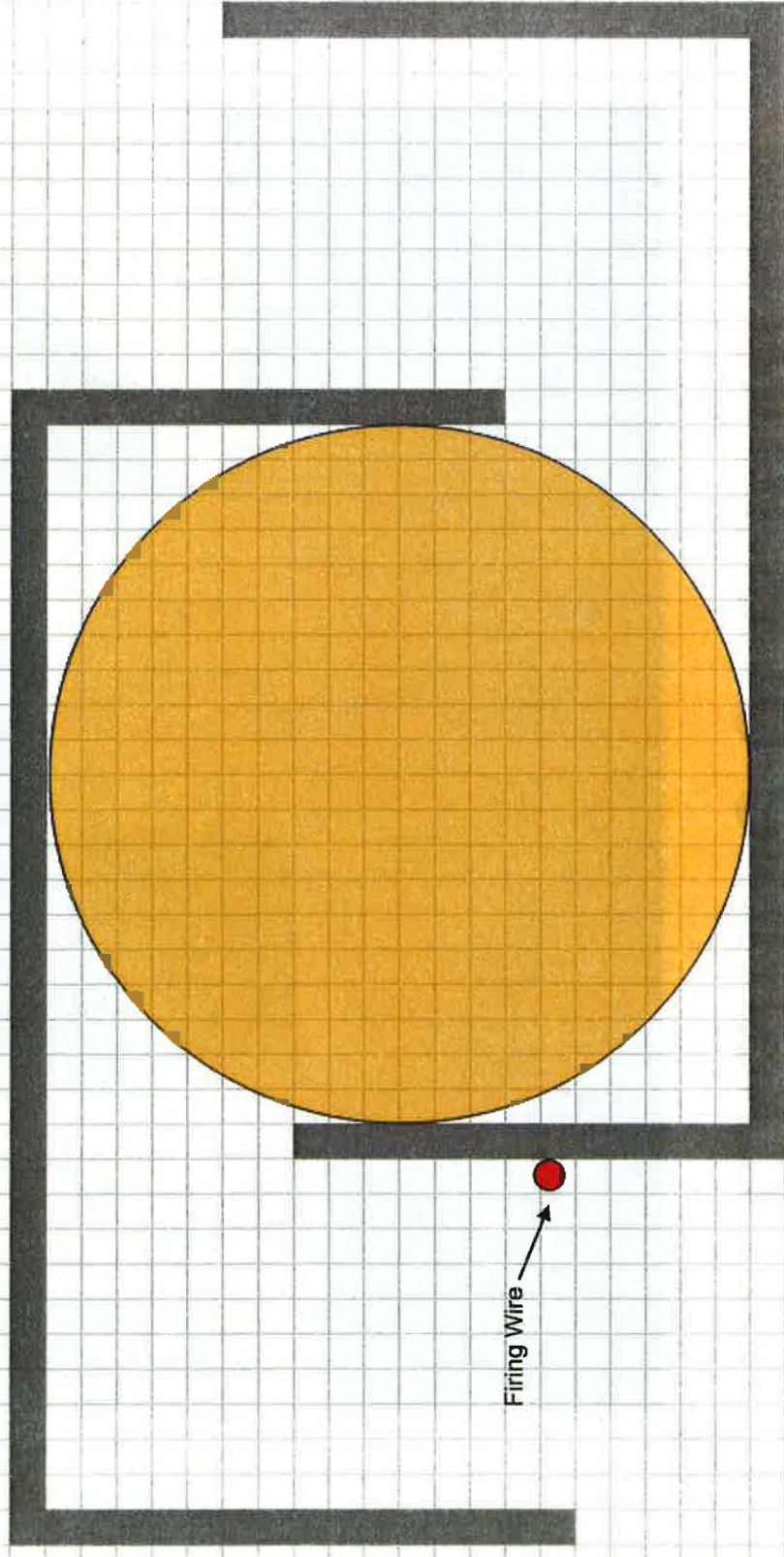
NRC
National Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-833-1998
fax: 608-833-1995

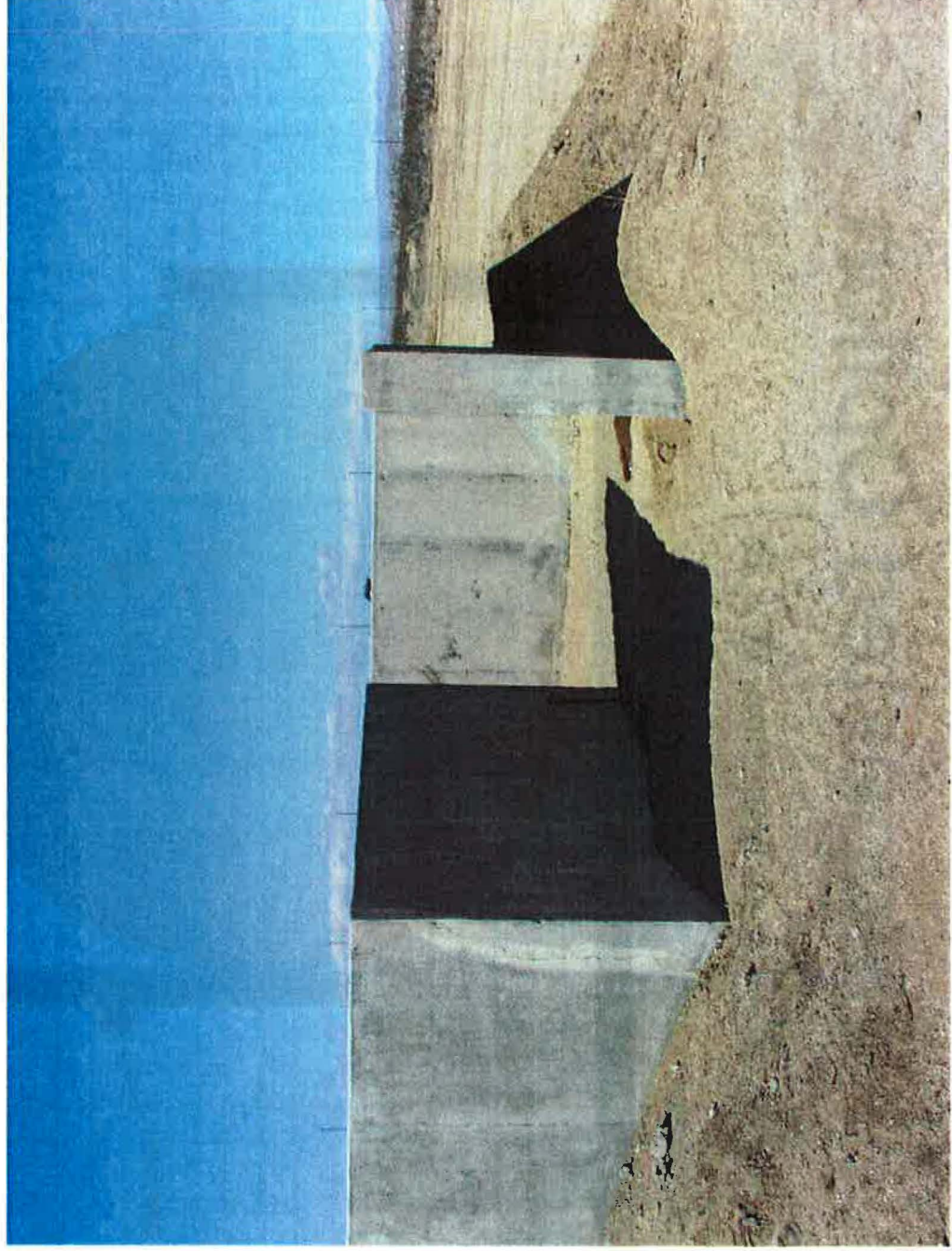
Suggested Option

-Area will need to be no less than 46'x 24'

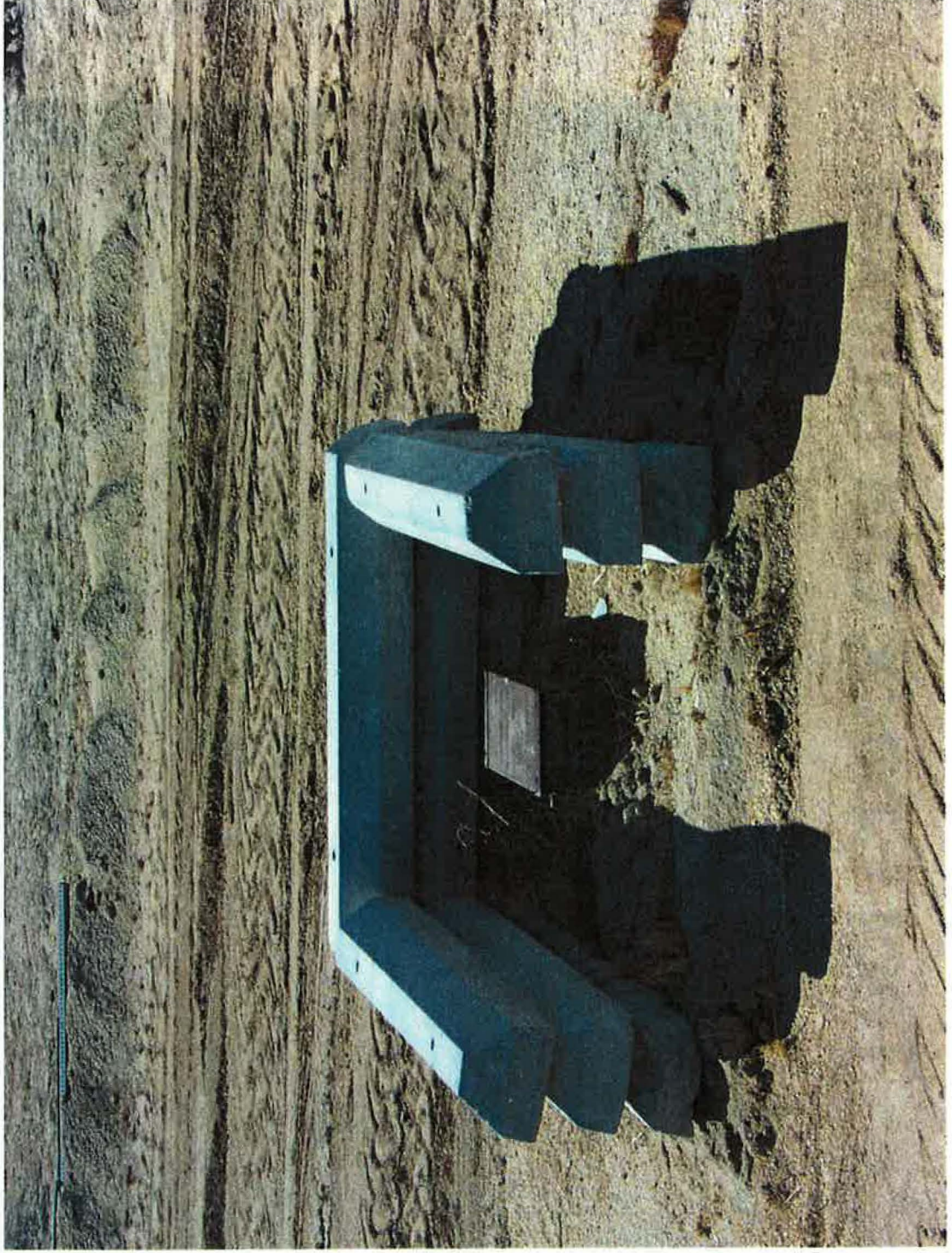
-20' diameter circle



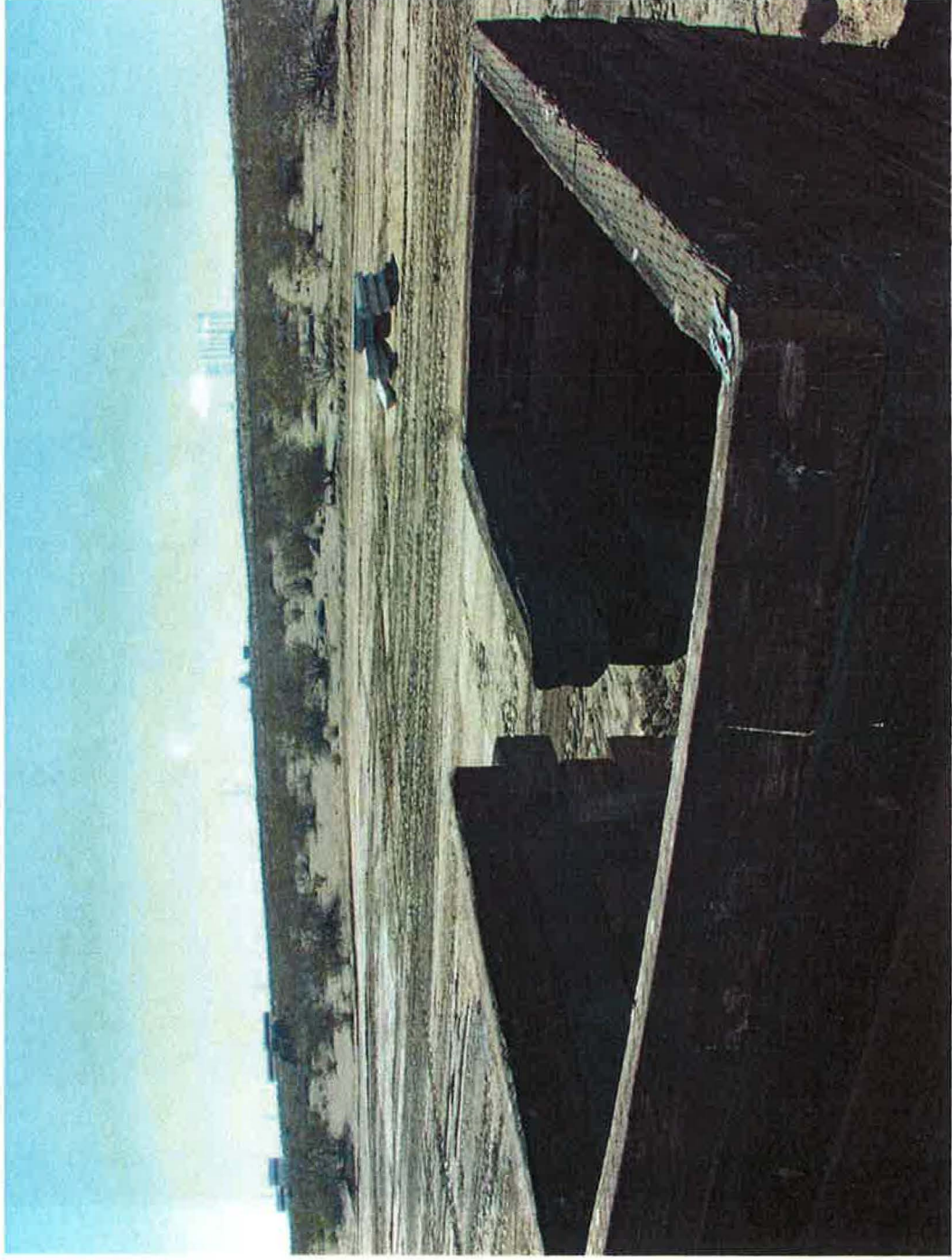
Example of Barrier



Holding Area



Tool Check Out Bunker





CTI and Associates, Inc.

12482 Emerson Drive Brighton, MI 48116 248.486.5100 248.486.5050 Fax

October 16, 2008

Dr. Mary Knapp
U.S Department of Interior
Fish & Wildlife Service
6950 Americana Pkwy, Suite H
Reynoldsburg, OH 43068-4127

**Subject: Section 7 Endangered Species
Environmental Assessments
Wright Patterson AFB
Greene County, Ohio**

Dear Dr. Knapp:

On behalf of 88 ABW/CEVY at Wright Patterson AFB (WPAFB), CTI and Associates, Inc. (CTI) is providing the attached four (4) figures for inclusion with the letter requesting agency consultation submitted on September 23, 2008. The letter clearly identifies the scope of the proposed activities at the Former ABDR site located at WPAFB, however, the figures detailing the specific location and environment were inadvertently omitted from the original letter.

We appreciate your consideration of this additional support information. Please contact Raymond Baker, WPAFB, at (937) 257-0177 if there are questions regarding this addendum or the information provided in the original request letter.

Sincerely,
CTI and Associates, Inc.

A handwritten signature in black ink, appearing to read 'Terri Zick', is written over a horizontal line.

Terri Zick
Director of Compliance Services

Cc: Raymond Baker, WPAFB
Jeff Jones, Tetra Tech

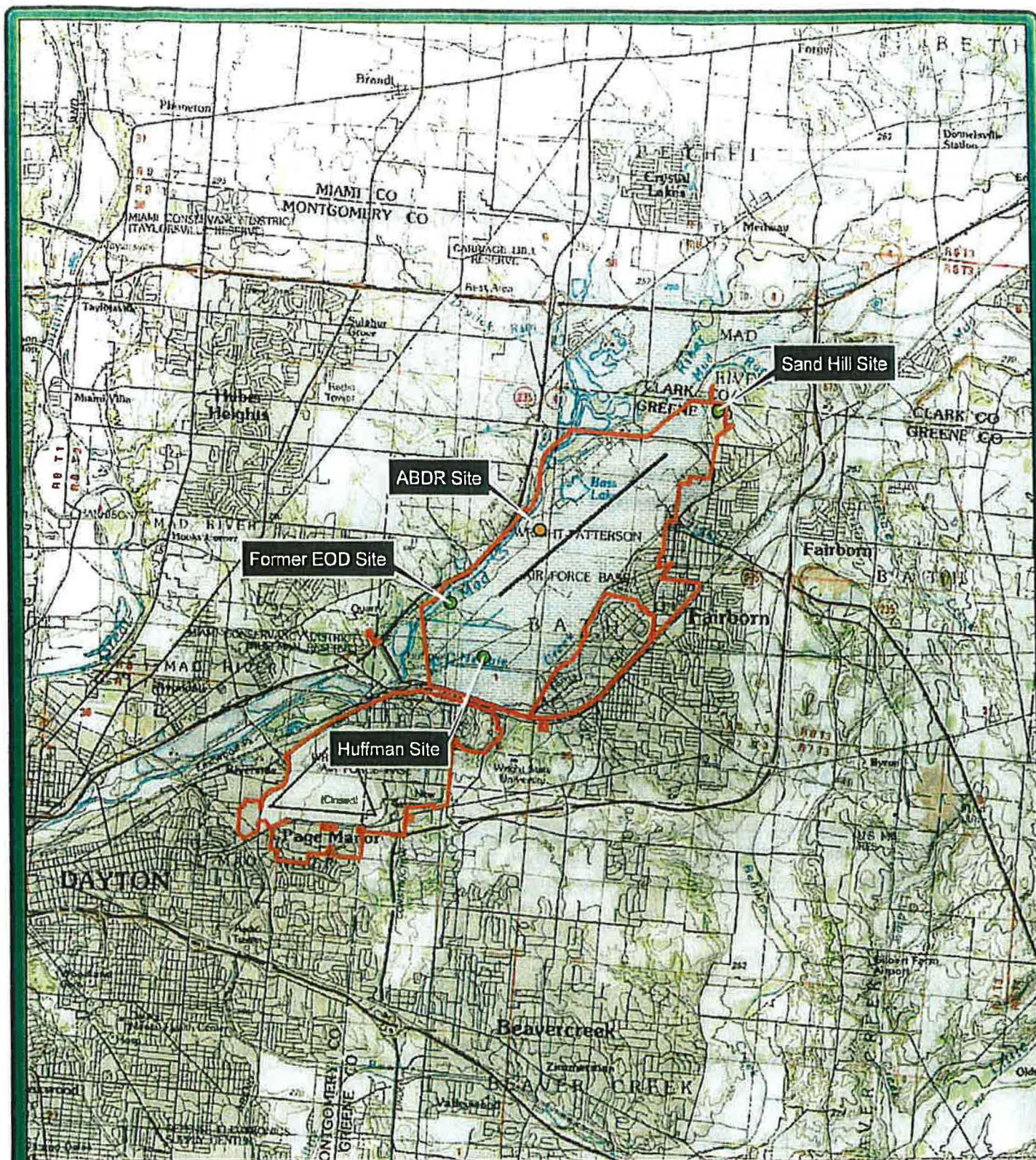


Figure 1. Project Location and Topography
Wright-Patterson Air Force Base

CONFIDENTIAL



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified October 9, 2008

Legend

- Installation Area
- Detonation Structure Location
- ABDR Site

NRC
National Response Consulting, Inc.

200 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53577-0128
Phone: 608-839-1818
Fax: 608-839-1985



Figure 2. Environmental Features
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
TOBN, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified October 9, 2008

Legend

- Installation Boundary
- ABDR Site
- Environmental Restoration Site
- Sh8 Map Unit Area
- Waterway

NRC
National Resource Center

259 Courthouse Parkway
P.O. Box 123
Cottage Grove, WI 53027-0128
phone: 608-837-1978
fax: 608-837-1998

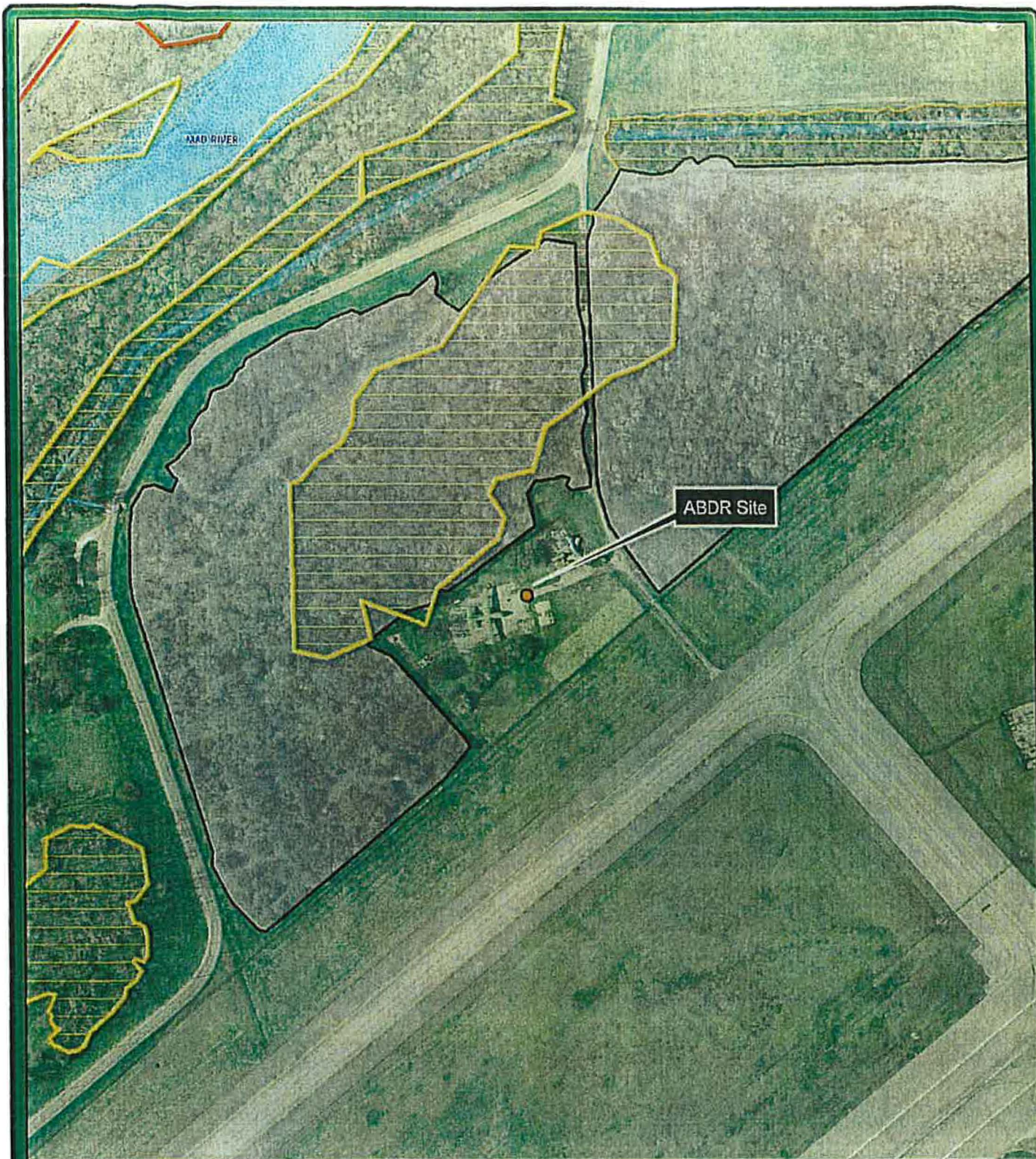


Figure 3. Threatened and Endangered Species Occurrences
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 feet

Project Information
Project Number : 008-0185-01
Modified October 9, 2008

Legend

Installation Boundary	Clubshell
ABDR Site	Indiana Bat
Bald Eagle	Waterway
Blazing Star Stem Borer	

NRC
NATIONAL RESOURCES CONSULTING, INC.

209 Commerce Parkway
P.O. Box 120
Cottage Grove, WI 53027-0120
phone: 608-839-1990
fax: 608-839-1995



DEPARTMENT OF THE AIRFORCE

HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

March 9, 2009

88 ABW/CEVY
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Dr. Mary Knapp
U.S. Department of Interior
Fish & Wildlife Service
6950 Americana Pkwy, Suite H
Reynoldsburg, OH 43068-4127

Subject: Section 7 Endangered Species
Environmental Assessments
Wright Patterson AFB
Greene County, Ohio

Dear Dr. Knapp:

As you are aware from our previous correspondence dated September 23, 2008, Wright-Patterson AFB is preparing an Environmental Assessment (EA) for two projects designed to support training efforts on the base.

One of the EAs is intended to evaluate the proposed construction and operation of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range. In the above mentioned letter, we previously requested consultation on three individual prospective locations for this training operation. Since the time of our correspondence, we have identified a fourth potential location for EOD training activities which is identified as the Skeel Avenue Site (Area C of WPAFB).

As part of these assessments, we are seeking informal consultation with the Fish and Wildlife Service in compliance with Section 7 of the Endangered Species Act in support of the projects designed to support training efforts at WPAFB.

The proposed EOD operation, involves providing proficiency training to EOD personnel. At worse case this involves 3 days/week, 8 hours/day of training (this has been revised from what was originally stated in our September correspondence). The 8 hours involves setting up/training for the detonation of explosive materials (maximum explosive material detonated is 5 lbs C4 at one time). The actual detonation/explosion takes less than 1 second. The "clear" zone around the detonation site is a 500 foot radius. The detonations will be performed inside a concrete walled containment barrier. This site will also be used to detonate unexploded ordnance that comes from the base or also from the public; this is a random occurrence with a frequency of maybe once/month.

The attached maps provide information on the location of the Skeel Avenue alternative site which is under consideration. Known locations of wetlands and potential endangered species habitats in the vicinity of the alternative site location are provided in the attached maps.

Thank you for your consideration. Please return your comments to me at the above address. If you have any questions, please contact me at (937) 257-0177 or by email at Raymond.Baker@wpafb.af.mil.

Sincerely



RAYMOND F. BAKER
Chief, Quality Branch
Environmental Management Division

Enclosures: USGS Quadrangle Map
Aerial Photo Map
Wetlands and Endangered Species Habitat Map

cc: Jeff Jones, Tetra Tech

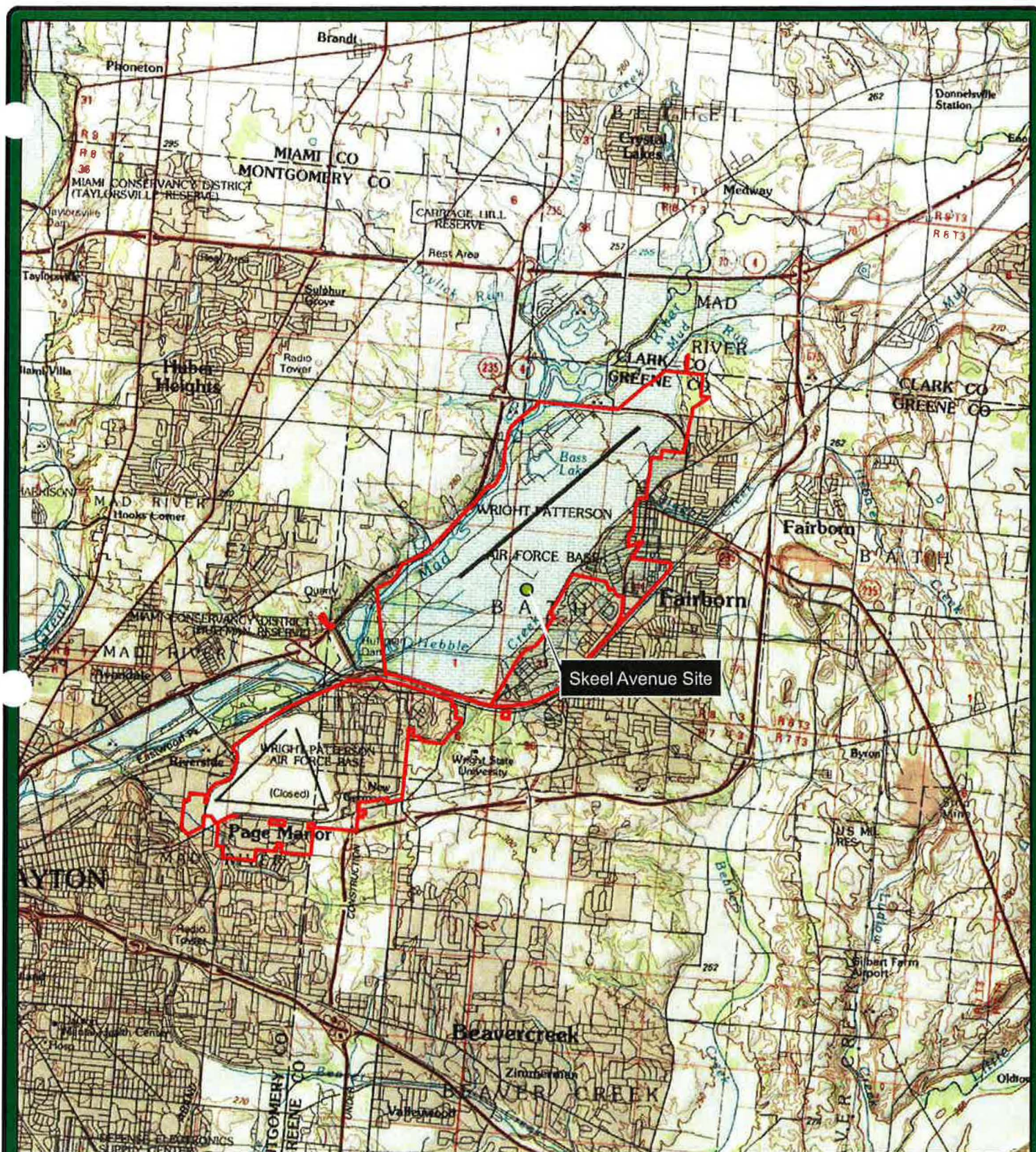
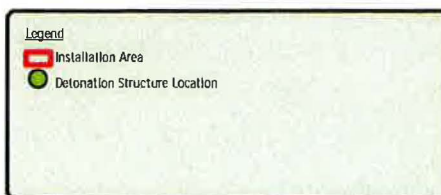
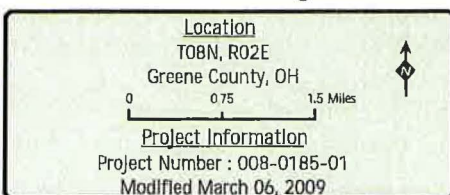


Figure 1. Project Location and Topography
Wright-Patterson Air Force Base

CONFIDENTIAL





DEPARTMENT OF THE AIRFORCE

HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

March 9, 2009

88 ABW/CEVY
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Dr. Mary Knapp
U.S. Department of Interior
Fish & Wildlife Service
6950 Americana Pkwy, Suite H
Reynoldsburg, OH 43068-4127

Subject: Section 7 Endangered Species
Environmental Assessments
Wright Patterson AFB
Greene County, Ohio

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Thank you for your consideration. Please return your comments to me at the above address.
If you have any questions, please contact me at (937) 257-0177 or by email at
Raymond.Baker@wpafb.af.mil.

Sincerely



RAYMOND F. BAKER
Chief, Quality Branch
Environmental Management Division

Enclosures: USGS Quadrangle Map
Aerial Photo Map
Wetlands and Endangered Species Habitat Map

cc: Jeff Jones, Tetra Tech

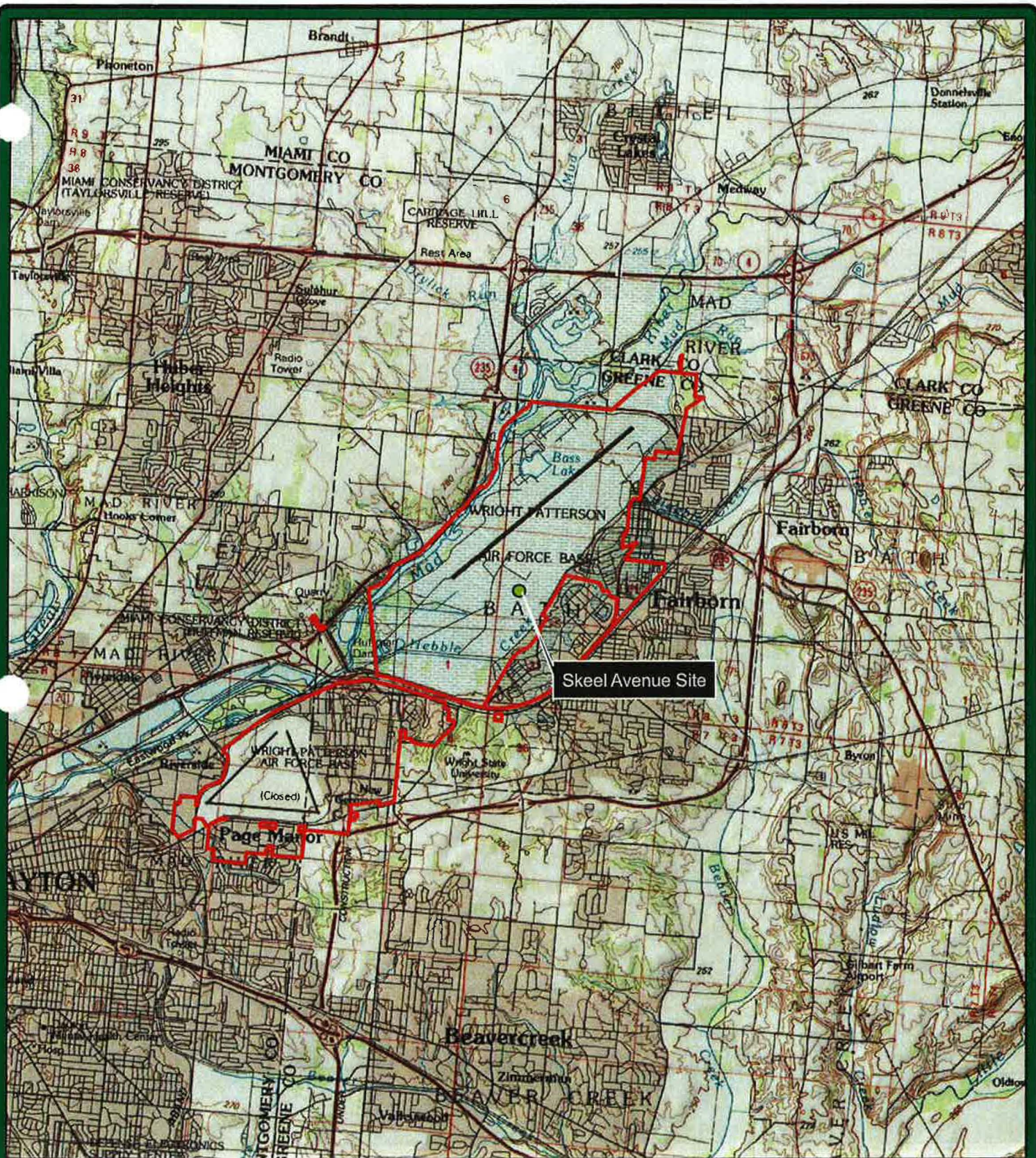


Figure 1. Project Location and Topography
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 0.75 1.5 Miles

Project Information
Project Number : 008-0185-01
Modified March 06, 2009

Legend

- Installation Area
- Delonation Structure Location

NRC
National Resources Council of Ohio, Inc.

209 Commercial Parkway
P.O. Box 128
Cincinnati, Ohio 45227-0128
phone: (513) 839-1998
fax: (513) 839-1995
www.nrc-ohio.org

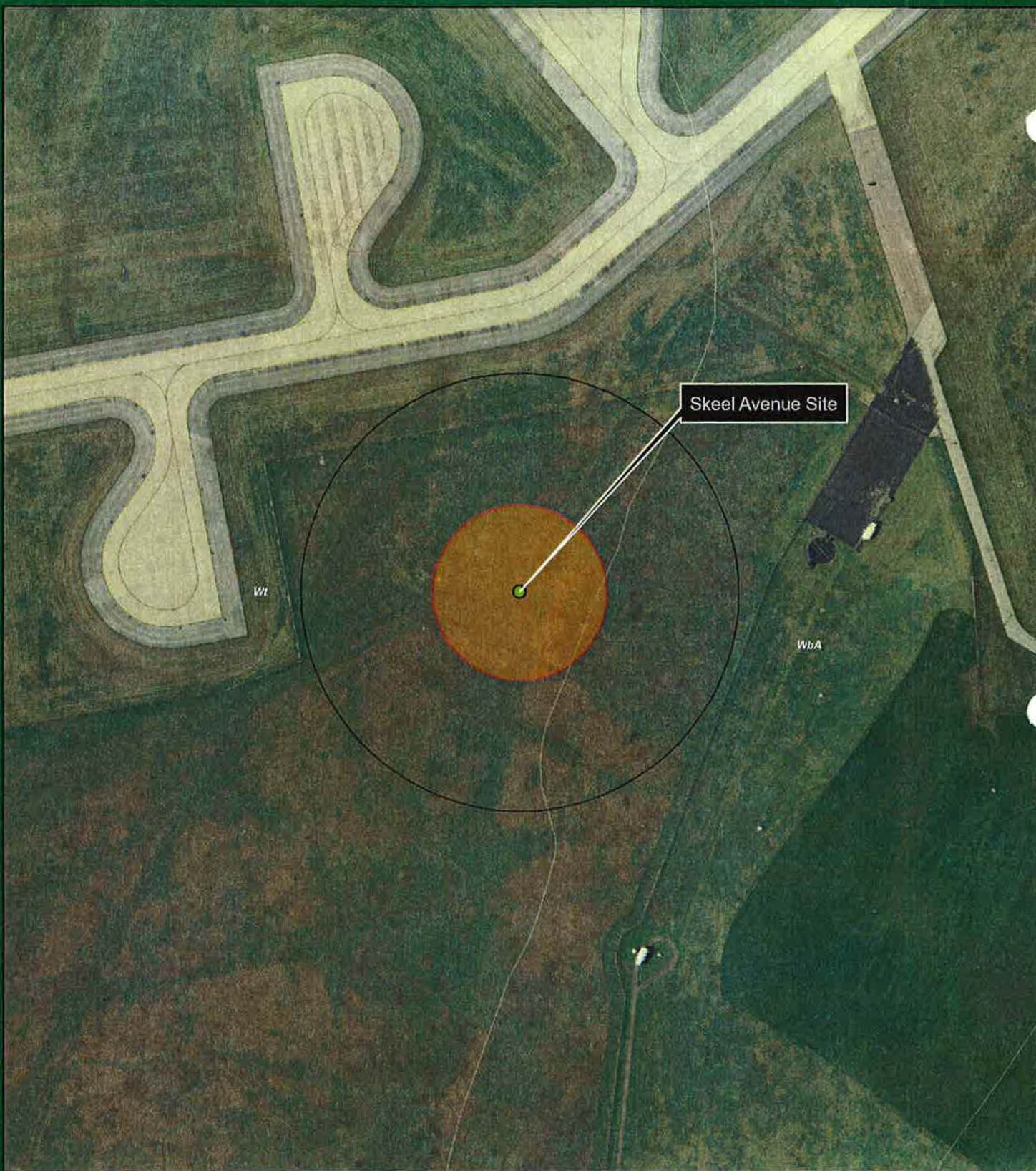


Figure 2. Environmental Features
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified March 06, 2009

Legend

- Detonation Structure Location
- Combustible Free Zone (200 ft)
- Delonation Structure Buffer (500 ft)
- Wetland Area*
- Environmental Restoration Site*
- Soil Map Unit Area
- Waterway*

*Not Present in Data Frame

NRC
Natural Resources Consulting, Inc.
209 Commerce Parkway
P.O. Box 128
Collage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.nrcenvironment.com



Figure 3. Threatened and Endangered Species Occurrences
Wright-Patterson Air Force Base

CONFIDENTIAL



Location
TOBN, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified March 06, 2009

Legend

- Detonation Structure Location
- Combustible Free Zone (200 ft)
- Detonation Structure Buffer (500 ft)
- Blazing Star Stem Borer

NRC
National Resources Consulting, Inc.
209 Commerce Parkway
P.O. Box 128
Coitlage Grove, WI 53527-0128
phone: 608-830-1908
fax: 608-830-1995
nrc@nrcwi.com

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3/18/2009

FWS Response



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
614-416-8993 / FAX 614-416-8994

March 18, 2009

*RBaker
24 Mar 09*
Raymond Baker
88 ABW/CEVY
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH, 45433

TAILS: 2009-FA-0033

Re: WPAFB EOD Range and ABDR Facility site, Greene County, OH

Dear Mr. Baker:

This is in response to your September 23, 2008 letter requesting information we may have regarding the occurrence or possible occurrence of federally listed threatened or endangered species within the vicinity of the proposed project located within the Wright-Patterson Air Force Base in Greene County, Ohio. We understand WPAFB has two proposed projects designed to support training efforts on the base. According to your letter, the first project involves construction and operation of the 88 ABV/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range. The second proposed project involves a National Air and Space Intelligence Center (NASIC) and Air Force School of Aerospace Medicine Expeditionary Medical (USAFSAM EMEDS) Support field training activities for the former Aircraft Battle Damage and Repair (ABDR) Facility site. Additional information was received by email on the proposed projects on December 31, January 7, and March 4, and 16 2009.

There are no Federal wildlife refuges, wilderness areas, or Critical Habitat within the vicinity of this site.

According to your information, the EOD operations involve providing proficiency training to EOD personal. We understand the maximum operations would be conducted on average of 3 days/week, up to 8 hours/day setting up/training for the detonation of explosive materials. We understand the maximum number of detonations that would occur is 1 detonation per hour in an 8 hour period and infrequent night time training may occur. These detonations would be controlled within the confines of a 6' H x 46' L x 24' W, precast concrete containment structure to be erected at the proposed site. In addition, two small barriers, approximately 6' L x 6' W x 4' H to contain tools and explosives and a gravel access road and parking area is proposed to be constructed. According to your information, a 200' radius around the detonation site will need to be cleared and maintained with mowing.

The massasauga is often found in or near wet areas, including wetlands, wet prairie, or nearby woodland or shrub edge habitat. This often includes dry goldenrod meadows with a mosaic of early successional woody species such as dogwood or multiflora rose. Wet habitat and nearby dry edges are utilized by the snakes, especially during the spring and fall. Dry upland areas up to 1.5 miles away are utilized during the summer, if available. For additional information on the eastern massasauga, including project management ideas, please visit the following website: <http://www.fws.gov/midwest/Endangered/lists/candidat.html> or contact this office directly.

The eastern massasauga is known to be present within the WPAFB. We understand a presence/absence survey is currently being conducted by Jeff Davis this spring 2009 and will continue into the fall. We understand that eastern massasaugas have been previously reported from the Prime BEEF Training Area (PBTA) and Twin Base Golf Course (TBGC) and that surveys conducted within the PBTA captured massasaugas in 1993. The Service is concerned with the close proximity of the proposed locations and any potential impacts to this species and/or its habitat. It appears some of the proposed EOD site locations may contain habitats listed above and we would like to set up a sit visit to determine if suitable habitat is present within the proposed locations.

The proposed project lies within the range of the **snuffbox** (*Epioblasma triquetra*), a Federal freshwater mussel species of concern and an Ohio endangered species and the **clubshell** (*Pleurobema clava*), a federally listed endangered freshwater mussel. These mussels are potentially present in the Little Miami River. Due to the location of the proposed project, no impacts are expected for these mussel species.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed ESA section 7 consultation document.

If you have questions, or if you would like to set up a site visit, please contact Melanie Cota at extension 15 in this office or by email at Melanie_Cota@fws.gov or visit our website at <http://www.fws.gov/midwest/Reynoldsburg/>.

Sincerely,



Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

4/7/2009

WPAFB Consultation Request

Refer to Public Notice

Location: *Other Correspondence* Section, Appendix A

THIS PAGE WAS INTENTIONALLY LEFT BLANK

5/6/2009

FWS Response



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

May 6, 2009

Raymond Baker
88 ABW/CEVY
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH, 45433

TAILS: 2009-TA-0606

TAILS: 2009-FA-0033

Re: WPAFB Explosive Ordnance Disposal (EOD) Range, Greene County, OH

Dear Mr. Baker:

This is in response to your March 31, 2009 draft EA that was received on April 7, 2009 of the proposed Explosives Ordnance Disposal Proficiency Training and Emergency Disposal Range project located within the Wright Patterson Air Force Base in Greene County, Ohio. The Service has previously provide technical assistance in a letter dated March 18, 2009 on the proposed Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range and field training activities for the former Aircraft Battle Damage and Repair (ABDR) Facility site. Additional information was received by email on the proposed projects on December 31, January 7, and March 4, and 16, 2009. The Service made a site visit to WPAFB to inspect the 4 potential EOD alternative locations on April 7, 2009.

The U.S. Fish and Wildlife Service recommends that proposed activities minimize water quality impacts and impacts to quality fish and wildlife habitat, such as forests, streams, and wetlands. Riparian zone habitat should be preserved wherever possible. Vegetated areas along streams and rivers stabilize the banks, provide fish and wildlife habitat, filter pollutants and excess nutrients, store excess water during storm events, and minimize sedimentation. Best Management Practices (BMP's) should be utilized to minimize sedimentation and erosion. We support and recommend mitigation activities that reduce the likelihood of invasive plant spread and encourage native plant colonization. Prevention of non-native, invasive plant establishment is critical in maintaining high quality habitats. All disturbed areas in the project vicinity should be mulched and revegetated with native plant species.

According to your information, the EOD operations involve providing proficiency training to EOD personal. We understand the maximum operations would be conducted on average of 3 days/week, up to 8 hours/day setting up/training for the detonation of explosive materials. We understand the maximum number of detonations that would occur is 1 detonation per hour in an 8 hour period and infrequent night time training may occur. These detonations would be controlled within the confines of a 6' H x 46' L x 24' W, precast concrete containment structure to be erected at the proposed site. In addition, two small barriers, approximately 6' L x 6' W x 4' H to contain tools and explosives and a gravel access road and parking area is proposed to be constructed. According to your information, a 200' combustible free radius will need to be cleared of all vegetation and a 500' clear zone around the detonation site may need to be

maintained with mowing.

Proposed EOD Alternative Sites:

We understand the proposed EOD training site involves 4 potential locations:

1. Former EOD Range (Western edge near Mad River, Area C of WPAFB): This site is located approximately 335 ft se from the Mad River within the 10 year flood plain. The site has a heavily wooded riparian corridor. Wetlands and streams present within the project area.
2. Hebble Creek Rd Site (N of Hebble Creek Road and W of the Huffman Prairie Flying Filed): This site is an undeveloped field that is currently mowed. No wetlands or streams present within the project area.
3. Sand Hill (North of Area C, NE area corner of WPAFB,): This site is undeveloped Shrub/scrub area. Wetlands and streams present within the project area.
4. Skeel Avenue (N of Huffman Prairie and W of Skeel Avenue, S of WBAFB airfield): This site is undeveloped prairie. No wetlands or streams present within the project area. We understand this is the DOD's preferred alternative.

The proposed project lies within close proximity of the **Indiana bat** (*Myotis sodalis*), a federally listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. During winter, Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

- (1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
- (2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
- (3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

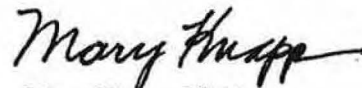
Should the proposed site contain trees or associated habitats exhibiting any of the characteristics listed above, we recommend that the habitat and surrounding trees be saved wherever possible. We understand that survey work in 2000 and 2007 detected Indiana bats at WPAFB. The Service is concerned about any impacts to suitable roosting or foraging habitat within the WPAFB. It appears that the only alternative to have potential to impact this species would be the Former EOD Range (alternative 1) which may have potential for suitable roosting and foraging habitat for the Indiana bat. In addition to this, this site is within approximately ¼ mile from a positive capture south of the site along the forested riparian area of the Mad River. As we know Indiana bats are using this area for roosting and foraging, the Service does not recommend this site as a location for the EOD project and also does not recommend it as it is located with a floodplain and contains valuable wetland habitat. Although the Sand Hill Site (alternative 3) did not appear to have suitable roosting habitat, the Service is concerned that construction of the EOD site at this location may have impacts to adjacent wetlands surrounding the site that might serve as foraging for this species. For this reason, the Service also does not recommend the Sand Hill site location. The Service agrees that the preferred location of the Skeel Avenue site (preferred alternative 4) would not be expected to impact this species or its habitat, due to the lack of roosting and foraging habitat at this location.

in Ohio are small and isolated and are presumed to be declining at WPAFB. Habitat modification appears to be the major threat to this species population within the WPAFB. Restoration of this site would allow more suitable habitat for this species as well as a connecting corridor to other adjacent suitable habitats that would serve to increase the success of this species at WPAFB.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed ESA section 7 consultation document.

If you have questions, or if you would like to set up a site visit, please contact Melanie Cota at extension 15 in this office or by email at Melanie_Cota@fws.gov or visit our website at <http://www.fws.gov/midwest/Reynoldsburg/>.

Sincerely,

A handwritten signature in black ink, appearing to read "Mary Knapp", with a stylized flourish at the end.

Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

The project lies within close proximity of the eastern massasauga (*Sistrurus catenatus catenatus*), a docile rattlesnake that is declining throughout its national range and is currently a Federal Candidate species. The snake is currently listed as endangered by the State of Ohio. Your proactive efforts to conserve this species now may help avoid the need to list the species under the Endangered Species Act in the future. Due to their reclusive nature, we encourage early project coordination to avoid potential impacts to massasaugas and their habitat. At a minimum, project evaluations should contain delineations of whether or not massasauga habitat occurs within project boundaries.

The massasauga is often found in or near wet areas, including wetlands, wet prairie, or nearby woodland or shrub edge habitat. This often includes dry goldenrod meadows with a mosaic of early successional woody species such as dogwood or multiflora rose. Wet habitat and nearby dry edges are utilized by the snakes, especially during the spring and fall. Dry upland areas up to 1.5 miles away are utilized during the summer, if available. For additional information on the eastern massasauga, including project management ideas, please visit the following website: <http://www.fws.gov/midwest/Endangered/lists/candidat.html> or contact this office directly.

The eastern massasauga is known to be present within the WPAFB. We understand a presence/absence survey is currently being conducted by Jeff Davis this spring 2009 where previous records and reports of snakes have been found. We understand that eastern massasaugas have been previously reported from the Prime BEEF Training Area (PBTA) and Twin Base Golf Course (TBGC) and that surveys conducted within the PBTA captured massasaugas in 1993. We understand that WPAFB is interested in doing a more comprehensive survey within the base of suitable habitat for this species and the Service appreciates and encourages this effort to manage and conserve this species.

The Service is concerned with the close proximity of the proposed locations and any potential impacts to this species and/or its habitat. It appears that all of the proposed site locations would be located in or within close proximity to the eastern massasauga rattlesnake's habitat. The Skeel Avenue site, (preferred alternative 4), is the location that is surrounded by the most development and although proposed to impact prairie habitat, we feel this site would be the least disruptive to this species and its habitat. During the site visit, this site was inspected for eastern massasauga habitat within the immediate location of the proposed EOD and the site appeared to lack suitable soils and burrows for this species. The proposed project plan of the 500 ft clear zone would impact approximately 16 acres of the Huffman Prairie, which includes impacts to approximately 7.5 acres of the Huffman Prairie National Landmark. The Service is concerned with the impacts and fragmentation to this prairie as areas may have potential habitat for this species. However, the Service feels that all other alternative site locations would pose more of a threat to this species, given their locations in or adjacent to quality habitat. For this reason, the Service agrees that the Skeel Avenue site (alternative 4) would be the preferred alternative for the EOD location given that is mostly surrounded by development and lacking preferred habitat for this species. Please note that ODNR, DOW should be consulted for state listed species that may be impacted by this proposed project.

We understand that WPAFB plans to mitigate for prairie impacts if the preferred alternative 4 (Skeel Avenue) is selected. The Hebble Creek Rd site (alternative 2) appears to be regularly mowed, which has made this area unusable by the eastern massasauga rattlesnake. The Service recommends any mitigation activities be geared toward restoring this area to native prairie and reconnecting this property to the surrounding suitable habitat. All eastern massasauga populations

12/31/08; 1/7/09; 3/4/09; 3/16/09; 6/1/09; 7/22/09

WPAFB Consultation Request (E-mail)

060109 FWS Sec 106 consult1 and response.txt

FROM "Baker, Raymond F Civ USAF AFMC 88
ABW/CEVY" <Raymond.Baker@wpafb.af.mil>
06/01/2009 11:42 AM

To <Melanie_Cota@fws.gov>

cc "Beason, Karen N Civ USAF AFMC 88 ABW/CEVO" <Karen.Beason@wpafb.af.mil>

Subject RE: EOD EA

Hi Melanie,

the In your 6 May 09 response the following statement is made at the end of
letter:

"This letter provides technical assistance only and does not serve as a
completed ESA section 7 consultation document."

your It appears from this letter that you have evaluated the impacts from the
before construction and operation of the EOD range, and concur with the selection
of the Skeel Ave Site. Our question is, does the 6 May letter serve as

concurrence, or is there more consultation that needs to be completed

we can continue on with the selection of the site?

Thank you,
Raymond

-----Original Message-----

From: Melanie_Cota@fws.gov [mailto:Melanie_Cota@fws.gov]
Sent: Monday, June 01, 2009 1:30 PM
To: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY
Cc: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
Subject: RE: EOD EA

Hi Raymond,

and Although we do agree with the preferred alternative for the EOD site, I
previous don't believe the Service has received a determination of effects on the
the species within the project area from the DOD with this project. Since the
make DOD is the lead agency, the DOE needs to be made by that agency first in
required order to get concurrence from the FWS. I looked back through your letter

EA and did not find it but please correct me if I am mistaken. The
letters were technical assistance letters to advise on potential impacts
proposed projects may have on those species within the project area. I
understand you would like to pursue informal consultation, and once you
a determination of effects (ie. No Effect, NLAA w/ avoidance and
minimization measures addressed), we can move forward. Also, the eastern
massasauga is a Candidate species and no consultation is currently

060109 FWS Sec 106 consult1 and response.txt
however, the Service strongly encourages consultation for this species due to it's highly potential presence within the project area. Please let me know if you have any questions or need anything else. Thanks!

Melanie Cota
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, OH 43230
614-416-8993 Ext. 15
614-416-8994 (Fax)
Melanie_Cota@fws.gov

Terri Zick

From: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY [Raymond.Baker@wpafb.af.mil]
Sent: Tuesday, August 04, 2009 4:51 PM
To: jj45322@aol.com; Terri Zick; Drew Lonergan
Subject: RE: Nesting Eagles
Attachments: DDN 14 Feb 09 nesting eagles.pdf
Signed By: BAKER.RAYMOND.F.1230231105

Atch DDN article on eagles, just in case link doesn't work.

-----Original Message-----

From: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY
Sent: Tuesday, August 04, 2009 4:33 PM
To: jj45322@aol.com; Terri Zick; 'Drew Lonergan'
Subject: FW: Nesting Eagles

All,

Comments from ODNR below with atch guidance and also atch comments from USFWS regarding the nesting eagles at Eastwood Metro Park near the Harshman Rd entrance to the park.

In summary, due to the distance (approx 2.4 miles) from the eagles nest to the nearest proposed EOD site (Hebble Creek Rd Site) there are no adverse impacts to the nesting eagles. The eagles were discovered around Feb 09, see link for news article.

<http://www.daytondailynews.com/n/content/oh/story/news/local/2009/02/14/ddn021409eagles.html>

We will want to include these comments in the final EA.

Thanks
Raymond

-----Original Message-----

From: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
Sent: Wednesday, July 22, 2009 2:08 PM
To: Melanie_Cota@fws.gov
Cc: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY; Helton, John M Civ USAF AFMC 88ABW/CEVS; Keenan, Kristen A Civ USAF AFMC 88 ABW/CEVO; Mitchell, Brittney N Civ USAF AFMC 88 ABW/CEVO
Subject: FW: Nesting Eagles

Melanie,

During the review of the draft Environmental Assessment for the EOD Range. There was a question asked regarding impacts to nesting eagles near the base. There was a pair of nesting eagles recently sited at the Dayton wellfield southwest of Area C of the base. Below is the response from ODNR. Does USFWS have any comments or concerns?

Thanks,
Karen

2045 Morse Rd., Building D-3
Columbus, OH 43229-6693
Office: (614) 265-6378
Fax: (614) 267-4764
brian.mitch@dnr.state.oh.us

-----Original Message-----

From: Melanie_Cota@fws.gov [mailto:Melanie_Cota@fws.gov]
Sent: Wednesday, July 22, 2009 3:27 PM
To: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
Subject: Re: FW: Nesting Eagles

Hi Karen,

I am aware of a nest in Montgomery Co, SW of Huffman Metropark and approximately 3 miles from the Proposed EOD site (Huffman site). Is this the nest you are referring to? If so, due to the location and on-site habitat of the project, I do not foresee any impacts to this species. However, I will include our comments fyi on what we would recommend if a project was closer to a nest. Please let me know if it is not that nest. Thanks contacting me and checking!

The project area lies within the range of the bald eagle (*Haliaeetus leucocephalus*). The bald eagle has been removed from the Federal list of endangered and threatened species due to recovery. This species continues to be afforded protection by the Bald and Golden Eagle Protection Act and Migratory Bird Protection Act.

We recommend that you contact the Ohio Department of Natural Resources, Division of Wildlife, (419) 898-0960, for the location(s) of the eagle nest(s) in the county. If any active nests are located within ½ mile of the project site, we recommend that work at the site be restricted from mid-January through July to allow pre-nesting activities, incubation, and raising of the young.

If eagle nest is present within ½ mile:

In order to prevent adverse impacts to the bald eagle, we request that work at the site be restricted from mid-January through July. This will prevent disturbance of the eagles from the egg-laying period until the young fledge, which encompasses their most vulnerable times. We ask that you consult with this office before construction begins to confirm that the eagles have left the nest. Once this has been confirmed, construction may begin.

Melanie Cota
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, OH 43230
614-416-8993 Ext. 15
614-416-8994 (Fax)
Melanie_Cota@fws.gov

Dayton Daily News

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Bald eagles nest in Dayton

A public viewing area could be set up to view the four birds in northeast Dayton.

By Jim Morris, Staff Writer

Updated 8:54 PM Wednesday, May 13, 2009

Four bald eagles have established residency in northeast Dayton and two are building a nest. It's most likely the first bald eagle nest in Montgomery County in recent decades.

Viewing the nest by the public is difficult, but not impossible. If you stand by the Eastwood MetroPark lake entrance (the one with no traffic light, on Harshman Road), use strong binoculars or a scope and look just north of east, the nest is visible in a sycamore tree just past a pole with two transformers on it. Once the trees fill with leaves, it will not be visible.

It is located in a fenced, restricted area of Dayton's well fields.

"It's exciting to see four eagles here," Ohio Division of Wildlife officer Trent Weaver said. The two white-headed adults are rebuilding an old redtailed hawk's nest. The other two are juveniles, perhaps from the two adults' nest last year.

Weaver said if the juveniles, both with dark heads and tail feathers, are from this adult pair, there is a good chance the adults will have a successful nest this spring.

Typically, eagles find a nesting spot during the winter, work on it and then lay eggs in late February. The incubation period for one to three eggs is 35 days, with chicks fledging 10-12 weeks after hatching.

People are likely to see the birds flying over the park now and then.

The public is not allowed near the nest because it is located in a highly restricted area, and federal and state laws prohibit people from approaching the nest of an endangered or protected bird.

"The area is constantly watched and people will be prosecuted if they enter," Weaver said.

Dave Kohler, district wildlife supervisor for the Division of Wildlife, said he would like to see a public viewing area set up.

"We are going to talk to the city people to see what can be arranged," Kohler said. "It has been done in other restricted areas where a viewing area is fenced in, so people can see the nest but can't get onto the property.

"Being able to see bald eagles is great for the public and good public relations for the property owners," he added.

Bald eagles, once nearly extinct in Ohio, have spread throughout the state. Most nests are at Lake Erie.

Kohler pointed out there also are two new nests south of Dayton, one on the Great Miami River in Butler County and another on the Whitewater River in Hamilton County.



Contact this reporter at

(937) 225-2409 or

jmorris@DaytonDailyNews.com.

Find this article at:

<http://www.daytondailynews.com/news/dayton-news/bald-eagles-nest-in-dayton-40693.html>

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Dayton Daily News

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City trying to protect privacy of bald eagle family

Those who get too close are caught on camera

By Steve Bennish, Staff Writer

Updated 4:03 PM Thursday, May 14, 2009

DAYTON — The bald eagle has landed in Dayton and seems to be attracting people who want to get a little too close to the bird of prey.

The city's Mad River well field, just east of Eastwood MetroPark, is home to a family of two adult and two juvenile eagles who took up residence this year in a Sycamore tree by renovating the old nest of a red-tailed hawk.

The eagles are likely the first to nest in Montgomery County in decades. The family has an active following among dedicated birders, who peer through binoculars from a designated area at the eastern end of the Hydrobowl.

Word of the birds has spurred some to try to get up close by strolling in the "No Trespassing" zone that includes the well field.

Since the start of the year, Five Rivers MetroParks Ranger Chief Larry Jones said law enforcement has responded to six instances of trespassing on those fields.

"We just had to give people some warnings to leave that area," Jones said.

To counter the invasion, the city last month installed a sophisticated \$7,700 zoom lens observation camera that scans for intruders.

The sharp-eyed sentry works night and day, and unauthorized visitors can expect to find themselves in the clutches of the police if they ignore the warning signs, said Martha Schwendeman of the city's Division of Water Supply and Treatment.

There is the option to use the camera to transmit images of the eagles, and a photo of the nest is at cityofdayton.org/departments/pa/Pages/EagleWebcam.aspx.

City water employees have named the adult eagles "Jim and Cindy," to honor the late Jim Kennedy, a 34-year department employee, and his wife.

EDITOR'S NOTE: This story has been updated to reflect the correct price of the security camera installed at the city's Mad River well field is about \$7,700. Another security system to deter vandalism and trespassing at Dayton Water Department facilities cost \$34,141. Both items were paid for using Water Department funds.

Find this article at:

<http://www.daytondailynews.com/news/dayton-news/city-trying-to-protect-privacy-of-bald-eagle-family-118853.html>

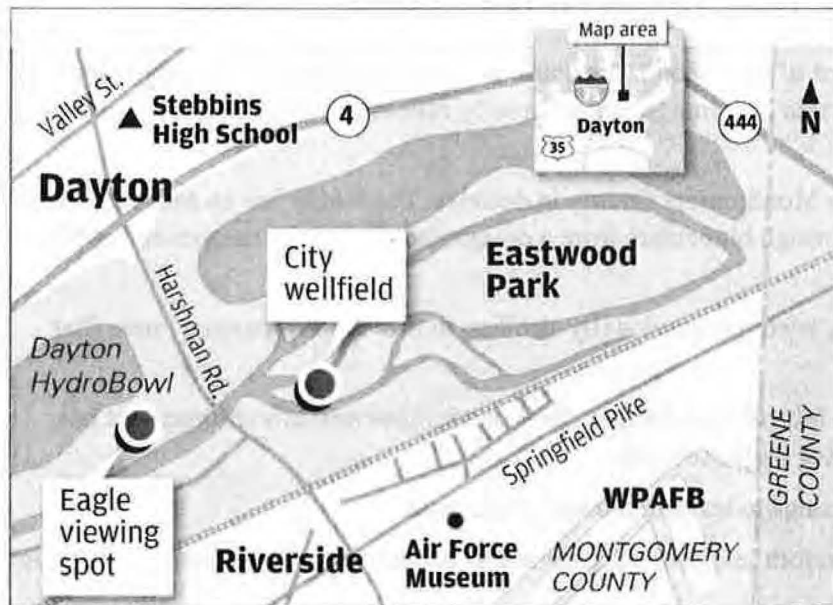
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Dayton Daily News

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STAFF MAP

Signs tell visitors where to park and how to point their binoculars to view the nest. Park hours are 8 a.m. to 10 p.m.

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072209 FWS eagle consult and response.txt

-----Original Message-----

From: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
Sent: Wednesday, July 22, 2009 2:08 PM
To: Melanie_Cota@fws.gov
Cc: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY; Helton, John M Civ USAF AFMC 88ABW/CEVS; Keenan, Kristen A Civ USAF AFMC 88 ABW/CEVO; Mitchell, Brittney N Civ USAF AFMC 88 ABW/CEVO
Subject: FW: Nesting Eagles

Melanie,

During the review of the draft Environmental Assessment for the EOD Range. There was a question asked regarding impacts to nesting eagles near the base. There was a pair of nesting eagles recently sited at the Dayton wellfield southwest of Area C of the base. Below is the response from ODNR. Does USFWS have any comments or concerns?

Thanks,
Karen

-----Original Message-----

From: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
[mailto:Karen.Beason@wpafb.af.mil]
Sent: Thursday, July 16, 2009 4:52 PM
To: Mitch, Brian
Cc: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY
Subject: Nesting Eagles

Good Afternoon Brian,

Wright-Patterson is in the process of Finalizing an Environmental Assessment for the location of a an Explosive Ordinance Disposal (Range). Initial coordination with ODNR occurred in October of 2008 (see attached). Since that time there has been a pair of nesting eagles identified in the Dayton wellfield southeast of the base. Are there any state guidelines regarding the protection of nesting eagles (i.e. safe distance, etc.). I will provide additional information as needed.

Thanks,
Karen

Natural Resources Manager
88 ABW/CEVO
(937)257-5899

-----Original Message-----

From: Mitch, Brian [mailto:Brian.Mitch@dnr.state.oh.us]
Sent: Wednesday, July 22, 2009 1:50 PM
To: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
Subject: RE: Nesting Eagles

Karen,

This is in response to your e-mail requesting information regarding bald eagles for the Environmental Assessment for Wright Patterson AFB. Attached are two documents providing guidance on how to avoid impacts to bald eagle nests. I suggest you also contact the U.S. Fish and Wildlife Service Ecological Services Office at (614)416-8993.

Brian Mitch, Environmental Review Manager Ohio Department of Natural Resources Environmental Services Section

THIS PAGE WAS INTENTIONALLY LEFT BLANK

6/1/2009

FWS Response (E-mail)

FROM "Baker, Raymond F Civ USAF AFMC 88
ABW/CEVY" <Raymond.Baker@wpafb.af.mil>
06/01/2009 11:42 AM

To <Melanie_Cota@fws.gov>

cc "Beason, Karen N Civ USAF AFMC 88 ABW/CEVO" <Karen.Beason@wpafb.af.mil>

Subject RE: EOD EA

Hi Melanie,

the In your 6 May 09 response the following statement is made at the end of
letter:

"This letter provides technical assistance only and does not serve as a
completed ESA section 7 consultation document."

your It appears from this letter that you have evaluated the impacts from the
before construction and operation of the EOD range, and concur with the selection
of the Skeel Ave Site. Our question is, does the 6 May letter serve as
concurrence, or is there more consultation that needs to be completed
we can continue on with the selection of the site?

Thank you,
Raymond

-----Original Message-----

From: Melanie_Cota@fws.gov [mailto:Melanie_Cota@fws.gov]
Sent: Monday, June 01, 2009 1:30 PM
To: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY
Cc: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
Subject: RE: EOD EA

Hi Raymond,

and Although we do agree with the preferred alternative for the EOD site, I
previous don't believe the Service has received a determination of effects on the
the species within the project area from the DOD with this project. Since the
make DOD is the lead agency, the DOE needs to be made by that agency first in
required order to get concurrence from the FWS. I looked back through your letter
EA and did not find it but please correct me if I am mistaken. The
letters were technical assistance letters to advise on potential impacts
proposed projects may have on those species within the project area. I
understand you would like to pursue informal consultation, and once you
a determination of effects (ie. No Effect, NLAA w/ avoidance and
minimization measures addressed), we can move forward. Also, the eastern
massasauga is a Candidate species and no consultation is currently

060109 FWS Sec 106 consult1 and response.txt
however, the Service strongly encourages consultation for this species due to it's highly potential presence within the project area. Please let me know if you have any questions or need anything else. Thanks!

Melanie Cota
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, OH 43230
614-416-8993 Ext. 15
614-416-8994 (Fax)
Melanie_Cota@fws.gov

7/2/09; 8/5/09

WPAFB Consultation Request



DEPARTMENT OF THE AIRFORCE

HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

July 2, 2009

88 ABW/CEVY
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Dr. Mary Knapp
U.S. Department of Interior
Fish & Wildlife Service
6950 Americana Pkwy, Suite H
Reynoldsburg, OH 43068-4127

Subject: Section 7 Endangered Species
Environmental Assessments
Wright Patterson AFB
Greene County, Ohio

Dear Dr. Knapp:

On September 23, 2008, and March 9, 2009 respectively, Wright-Patterson Air Force Base (WPAFB) requested an informal consultation with the US Fish and Wildlife Service (USFWS) in conjunction with the preparation of an Environmental Assessment (EA) for the proposed construction and operation of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range. The range has been proposed to support required training efforts at the base. Four individual locations within the installation were selected and included in the consultation request. Technical comments were received from the USFWS in a letter dated March 18, 2009.

Since the time of our initial correspondence and your reply, the draft EA has been completed and was submitted to USFWS on April 7, 2009 for comment. The USFWS provided technical comments on the draft EA in a letter dated May 6, 2009. At that time, the USFWS outlined concerns regarding potential impacts to the Indiana bat (*myotis sodalis*) and the eastern massasauga rattlesnake (*Sistrurus catenatus*). In conjunction with the request for informal consultation, you have indicated that WPAFB must provide determination of effects on the Indiana bat. You have also recommended that the massasauga rattlesnake be included in the determination although consultation is not currently required for Candidate species.

This correspondence has been prepared to address the issues raised in your May 6, 2009 letter and to formally request concurrence with the Determination of Effect presented below. Correspondence with the Ohio Department of Natural Resources regarding each of the proposed locations is attached for reference.

To reiterate the scope of the Proposed Action, the proposed EOD operation involves providing proficiency training to EOD personnel at a frequency of up to 3 days/week, 8 hours/day of training. The 8 hours involves setting up/training for the detonation of explosive materials (maximum explosive material detonated is 5 lbs C4 at one time). The actual detonation/explosion takes less than 1 second. The "clear" zone around the detonation site is a 500 ft radius. The detonations will be performed inside a concrete walled containment barrier. This site will also be used to detonate unexploded ordnance that originates from the base or from the public; this is a random occurrence with a frequency of approximately once per month.

In your May 6, 2009 letter, you have indicated that the proposed activities, regardless of the selected alternative, should be conducted so as to minimize impacts to water quality and wildlife habitat. Controls and mitigative measures outlined in the EA dated March 31, 2009 are intended to provide the protection recommended in your letter.

Your May 6, 2009 letter also outlined concerns regarding the presence of habitat for the Indiana bat and the eastern massasauga rattlesnake in areas near the Proposed Action. WPAFB has prepared this Determination of Effect (DOE) to address the potential effects of the Proposed Action on endangered species and/or their habitat.

Pertinent Species and Habitats

Listed Federal and State Endangered Species (and/or their habitat) in Vicinity of Proposed Action:

Indiana bat

Clubshell mussel

Bald eagle

Blazing star stem borer

Species of Concern in Vicinity of Proposed Action:

Sedge wren

Candidate Species in Vicinity of Proposed Action:

Eastern massasauga rattlesnake

Description of Potential Effects

A description of the potential effects and mitigative measures (where applicable) for the Proposed Action is outlined in Section 4.2 of the EA submitted to the USFWS on April 6, 2009 and summarized below:

Indiana Bat

Potentially suitable habitat for the Indiana bat was identified adjacent to one of the four proposed locations included in this consultation request. The Former EOD Site is bordered by wooded areas which could potentially support foraging and roosting during the summer maternity season (approximately April through August). No suitable winter hibernacula or critical habitat is known to exist on the base.

Former EOD Site

No adverse impacts to the Indiana bat are expected to occur from the EOD operations as the former EOD Site. Less than 0.1 acres of floodplain forest habitat would be eliminated in the extreme western part of the project area for establishment of the 200 foot combustible free zone. This area has not been identified as suitable habitat for the Indiana bat and is only of marginal quality for the Indiana bat due to the degraded conditions of the vegetation, small size of the trees and generally dense understory and mid-story layers.

Clearing of the old field vegetation or less than 0.1 acre of floodplain forest habitat is not likely to adversely affect the viability of the population of Indiana bats at WPAFB or fragment the large area of highly suitable habitat located to the west of the project area. Mitigative measures, however, have been identified which include conserving as many mature trees as possible when constructing the EOD range and preparing the combustible free zone.

Skeel Avenue Site / Hebble Creek Road Site / Sandhill Location

No suitable habitat for the Indiana bat has been identified at the Skeel Avenue Site, Hebble Creek Road Site, and Sandhill Location. Therefore no direct or indirect impact to the Indiana bat is expected from construction/operation of the Proposed Action.

Clubshell Mussel

No suitable habitat for the clubshell mussel has been identified at any of the proposed project locations. Therefore no direct or indirect impact to the clubshell mussel is expected from construction/operation of the Proposed Action.

Bald Eagle

Bald Eagles are only known to occur at WPAFB as rare winter visitors. Although potential habitat exists, there are no records of Bald Eagles nesting within the base, with the nearest known nest being 45 miles southeast of WPAFB. No observed occurrences of nesting bald eagles have been documented at any of the proposed project locations. Therefore no direct or indirect impact to the bald eagle is expected from construction/operation of the Proposed Action.

Blazing Star Stem Borer

Three of the four proposed locations support habitat (Skeel Avenue Site: 1.17 acres, Hebble Creek Road Site: 2.88 acres and Sandhill Location: 1.49 acres respectively) suitable for the blazing star stem borer. The potential effects are considered to be negligible as no host plants have been identified with the area of vegetation disturbance at any of the three above proposed locations.

No suitable habitat has been identified at the Former EOD Site.

Sedge Wren

Although suitable habitat exists in at the Skeel Avenue Site, presence of the sedge wren has not been documented at WPAFB since 1992. No adverse effects, therefore, are expected.

Eastern massasauga rattlesnake

No documented eastern massasauga rattlesnake habitat has been identified on any of the four proposed project locations, although each of the proposed sites is proximal to areas which do support eastern massasauga rattlesnake habitat. As a proactive measure, WPAFB has identified mitigative measures to minimize disturbance during construction and maintenance activities. Such measures include limiting construction activities to months when snakes are dormant, conducting mowing activities during mid-day hours when snakes are known to be less active and maintaining mower deck height of 4 inches or greater to avoid injuring snakes.

Additionally, efforts will be made to minimize the effects on wetlands near the Former EOD Site and Sandhill Location (if selected) to further preserve these areas assuming they may be within the range of the eastern massasauga rattlesnake. Mitigative measures will include erosion / sedimentation control to ensure that excessive sediments do not adversely affect the nearby wetlands. Any work within the wetlands will be conducted with the concurrence of the Ohio Environmental Protection Agency (OEPA).

Skeel Avenue Site

This site is located adjacent to the Huffman Prairie, and construction of the EOD range at this location would result in removal of up to 7.5 acres of vegetation from the prairie. In accordance with the Integrated Natural Resources Management Plan (INRMP), WPAFB will seek to mitigate the removed vegetation by expanding the Huffman Prairie in alternate directions with preference given to areas which may be currently isolated, creating contiguous prairie. Once established, the mitigated prairie vegetation will potentially provide suitable habitat for the eastern massasauga rattlesnake.

Determination of Effect and Requested Concurrence

WPAFB seeks written concurrence on the following determination of effect based on the above discussion and supporting details provided in the EA dated March 31, 2009.

No Effect/No Adverse Modification

Based on the details provided above and the supporting documentation provided in the EA dated March 31, 2009, WPAFB concludes that the Proposed Action will neither directly nor indirectly affect the following federally and state listed species and species of concern or destroy/adversely modify designated habitat.

Indiana bat (Skeel Avenue and Hebble Creek Road Sites)

Clubshell mussel (All Sites)

Bald eagle (All Sites)

Sedge wren (All Sites)

Blazing star stem borer (Former EOD Site)

Not Likely to Adversely Affect Species / Modify Habitat

Based on the details provided above and supporting documentation provided in the EA dated March 31, 2009, WPAFB concludes that the Proposed Action is not likely to adversely affect the following species or adversely modify habitat associated with the following species:

Indiana bat (Former EOD Site and Sandhill Location)

Blazing star stem borer (Skeel Avenue Site / Hebble Creek Road Site / Sandhill Location)

No Effect on Federal Candidate Species

Based on the lack of identified habitat and proactive mitigative measures outlined above and in the EA dated March 31, 2009, WPAFB concludes that the Proposed Action will neither directly nor indirectly affect the following species nor destroy/adversely modify designated habitat.

Eastern massasauga rattlesnake (All Sites)

Thank you for your consideration. Please return your comments to me at the above address. If you have any questions, please contact me at (937) 257-0177 or by email at Raymond.Baker@wpafb.af.mil.

Sincerely

A handwritten signature in black ink, appearing to read "Raymond F. Baker". The signature is fluid and cursive, with the first name "Raymond" being more prominent than the last name "Baker".

RAYMOND F. BAKER
Chief, Quality Branch
Environmental Management Division

Attachment:
ODNR Correspondence

cc: Jeff Jones/ Tetra Tech
Melanie Cota, USFWS

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

August 5, 2009

88 ABW/CEVY
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Dr. Mary Knapp
U.S. Department of Interior
Fish & Wildlife Service
4625 Morse Road, Suite 104
Columbus, OH 43230

Subject: Section 7 Endangered Species Consultation
Environmental Assessment
Wright Patterson AFB
Greene County, Ohio

Dear Dr. Knapp,

On September 23, 2008, March 9, 2009, and July 2, 2009, Wright-Patterson Air Force Base (WPAFB) corresponded with the US Fish and Wildlife Service (USFWS) regarding the occurrence or possible occurrence of federally listed threatened or endangered species within the vicinity of a proposed Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range located within WPAFB in Greene County, Ohio. In conjunction with the preparation of an Environmental Assessment (EA) for the proposed construction and operation of the EOD range, technical comments were received from the USFWS in letters dated March 18, 2009 and May 6, 2009. The USFWS identified the following species to be in the range of the proposed EOD range:

1. Indiana bat (*Myotis sodalists*), a federally listed endangered species
2. Clubshell mussel (*Pleurobema clava*), a federally listed endangered freshwater mussel
3. Eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*), a federal candidate species
4. Snuffbox mussel (*Epioblasma triquetra*), a federal freshwater mussel species of concern

WPAFB has selected the Skeel Avenue Site as the preferred location for the EA. This site is located within the Huffman Prairie and will impact approximately 16 acres of tallgrass prairie on the northeastern edge of the Huffman Prairie. WPAFB is requesting concurrence from the USFWS that the proposed construction and operation of the EOD range at the Skeel Avenue Site has no effect on the Indiana bat, clubshell mussel and snuffbox mussel. Neither the species nor the habitat (trees) for the Indiana bat or the mussels (freshwater bodies) exist at the Skeel Avenue Site, therefore no effect would occur on these species.

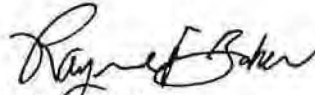
WPAFB is also requesting concurrence from the USFWS that the proposed construction and operation of the EOD range at the Skeel Avenue Site is not likely to adversely affect the eastern massasauga rattlesnake. No documented eastern massasauga rattlesnake species or habitat has been identified at the Skeel Avenue Site, although this site is proximal to areas (Prime BEEF Training Area and Twin Base Golf Course) which do support eastern massasauga rattlesnake habitat. As a proactive measure, WPAFB has identified

mitigative measures to minimize disturbance during construction and maintenance activities of the EOD range at the Skeel Avenue Site. Such measures include limiting construction activities and prairie burns to months (15 Nov – 1 Mar) when snakes are dormant; prior to commencing construction of the EOD range, survey the area for snakes; if snakes are identified during construction activities or operations of the range, immediately cease operations and contact both USFWS and the Ohio Department of Natural Resources; conduct mowing activities during overcast days with the temperature less than 65°F, or mid-day during hot temperatures greater than 80°F; and maintain mower deck height of 8-12 inches to avoid injuring snakes. In accordance with the WPAFB Integrated Natural Resources Management Plan, WPAFB will seek to mitigate the removed vegetation by expanding the Huffman Prairie in alternate directions with preference given to areas which may be currently isolated, creating contiguous prairie. Once established, the mitigated prairie vegetation will potentially provide suitable habitat for the eastern massasauga rattlesnake.

For these reasons, we conclude that the construction and operation of the EOD range at the Skeel Avenue Site will have no effect on the Indiana bat, clubshell mussel and snuffbox mussel, and not likely to adversely affect the eastern massasauga rattlesnake or its habitat. We request your concurrence with our determinations.

Thank you for your consideration. If you have any questions, please contact me at (937) 257-0177 or by email at Raymond.Baker@wpafb.af.mil.

Sincerely



RAYMOND F. BAKER
Chief, Quality Branch
Environmental Management Division

cc: Jeff Jones, Tetra Tech
Melanie Cota, USFWS

7/22/2009

WPAFB Consultation Request (E-mail)

7/22/2009

FWS Response (E-mail)

Terri Zick

From: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY [Raymond.Baker@wpafb.af.mil]
Sent: Tuesday, August 04, 2009 4:51 PM
To: jj45322@aol.com; Terri Zick; Drew Lonergan
Subject: RE: Nesting Eagles
Attachments: DDN 14 Feb 09 nesting eagles.pdf
Signed By: BAKER.RAYMOND.F.1230231105

Atch DDN article on eagles, just in case link doesn't work.

-----Original Message-----

From: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY
Sent: Tuesday, August 04, 2009 4:33 PM
To: jj45322@aol.com; Terri Zick; 'Drew Lonergan'
Subject: FW: Nesting Eagles

All,

Comments from ODNR below with atch guidance and also atch comments from USFWS regarding the nesting eagles at Eastwood Metro Park near the Harshman Rd entrance to the park.

In summary, due to the distance (approx 2.4 miles) from the eagles nest to the nearest proposed EOD site (Hebble Creek Rd Site) there are no adverse impacts to the nesting eagles. The eagles were discovered around Feb 09, see link for news article.

<http://www.daytondailynews.com/n/content/oh/story/news/local/2009/02/14/ddn021409eagles.html>

We will want to include these comments in the final EA.

Thanks
Raymond

-----Original Message-----

From: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
Sent: Wednesday, July 22, 2009 2:08 PM
To: Melanie_Cota@fws.gov
Cc: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY; Helton, John M Civ USAF AFMC 88ABW/CEVS; Keenan, Kristen A Civ USAF AFMC 88 ABW/CEVO; Mitchell, Brittney N Civ USAF AFMC 88 ABW/CEVO
Subject: FW: Nesting Eagles

Melanie,

During the review of the draft Environmental Assessment for the EOD Range. There was a question asked regarding impacts to nesting eagles near the base. There was a pair of nesting eagles recently sited at the Dayton Wellfield southwest of Area C of the base. Below is the response from ODNR. Does USFWS have any comments or concerns?

Thanks,
Karen

072209 FWS eagle consult and response.txt

2045 Morse Rd., Building D-3
Columbus, OH 43229-6693
Office: (614) 265-6378
Fax: (614) 267-4764
brian.mitch@dnr.state.oh.us

-----Original Message-----

From: Melanie_Cota@fws.gov [mailto:Melanie_Cota@fws.gov]
Sent: Wednesday, July 22, 2009 3:27 PM
To: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
Subject: Re: FW: Nesting Eagles

Hi Karen,

I am aware of a nest in Montgomery Co, SW of Huffman Metropark and approximately 3 miles from the Proposed EOD site (Huffman site). Is this the nest you are referring to? If so, due to the location and on-site habitat of the project, I do not foresee any impacts to this species. However, I will include our comments fyi on what we would recommend if a project was closer to a nest. Please let me know if it is not that nest. Thanks contacting me and checking!

The project area lies within the range of the bald eagle (*Haliaeetus leucocephalus*). The bald eagle has been removed from the Federal list of endangered and threatened species due to recovery. This species continues to be afforded protection by the Bald and Golden Eagle Protection Act and Migratory Bird Protection Act.

We recommend that you contact the Ohio Department of Natural Resources, Division of Wildlife, (419) 898-0960, for the location(s) of the eagle nest(s) in the county. If any active nests are located within ½ mile of the project site, we recommend that work at the site be restricted from mid-January through July to allow pre-nesting activities, incubation, and raising of the young.

If eagle nest is present within ½ mile:

In order to prevent adverse impacts to the bald eagle, we request that work at the site be restricted from mid-January through July. This will prevent disturbance of the eagles from the egg-laying period until the young fledge, which encompasses their most vulnerable times. We ask that you consult with this office before construction begins to confirm that the eagles have left the nest. Once this has been confirmed, construction may begin.

Melanie Cota
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, OH 43230
614-416-8993 Ext. 15
614-416-8994 (Fax)
Melanie_Cota@fws.gov

Dayton Daily News

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Bald eagles nest in Dayton

A public viewing area could be set up to view the four birds in northeast Dayton.

By Jim Morris, Staff Writer

Updated 8:54 PM Wednesday, May 13, 2009

Four bald eagles have established residency in northeast Dayton and two are building a nest. It's most likely the first bald eagle nest in Montgomery County in recent decades.

Viewing the nest by the public is difficult, but not impossible. If you stand by the Eastwood MetroPark lake entrance (the one with no traffic light, on Harshman Road), use strong binoculars or a scope and look just north of east, the nest is visible in a sycamore tree just past a pole with two transformers on it. Once the trees fill with leaves, it will not be visible.

It is located in a fenced, restricted area of Dayton's well fields.

"It's exciting to see four eagles here," Ohio Division of Wildlife officer Trent Weaver said. The two white-headed adults are rebuilding an old redtailed hawk's nest. The other two are juveniles, perhaps from the two adults' nest last year.

Weaver said if the juveniles, both with dark heads and tail feathers, are from this adult pair, there is a good chance the adults will have a successful nest this spring.

Typically, eagles find a nesting spot during the winter, work on it and then lay eggs in late February. The incubation period for one to three eggs is 35 days, with chicks fledging 10-12 weeks after hatching.

People are likely to see the birds flying over the park now and then.

The public is not allowed near the nest because it is located in a highly restricted area, and federal and state laws prohibit people from approaching the nest of an endangered or protected bird.

"The area is constantly watched and people will be prosecuted if they enter," Weaver said.

Dave Kohler, district wildlife supervisor for the Division of Wildlife, said he would like to see a public viewing area set up.

"We are going to talk to the city people to see what can be arranged," Kohler said. "It has been done in other restricted areas where a viewing area is fenced in, so people can see the nest but can't get onto the property.

"Being able to see bald eagles is great for the public and good public relations for the property owners," he added.

Bald eagles, once nearly extinct in Ohio, have spread throughout the state. Most nests are at Lake Erie.

Kohler pointed out there also are two new nests south of Dayton, one on the Great Miami River in Butler County and another on the Whitewater River in Hamilton County.



Contact this reporter at

(937) 225-2409 or

jmorris@DaytonDailyNews.com.

Find this article at:

<http://www.daytondailynews.com/news/dayton-news/bald-eagles-nest-in-dayton-40693.html>

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Dayton Daily News

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City trying to protect privacy of bald eagle family

Those who get too close are caught on camera

By Steve Bennish, Staff Writer

Updated 4 03 PM Thursday, May 14, 2009

DAYTON — The bald eagle has landed in Dayton and seems to be attracting people who want to get a little too close to the bird of prey.

The city's Mad River well field, just east of Eastwood MetroPark, is home to a family of two adult and two juvenile eagles who took up residence this year in a Sycamore tree by renovating the old nest of a red-tailed hawk.

The eagles are likely the first to nest in Montgomery County in decades. The family has an active following among dedicated birders, who peer through binoculars from a designated area at the eastern end of the Hydrobowl.

Word of the birds has spurred some to try to get up close by strolling in the "No Trespassing" zone that includes the well field.

Since the start of the year, Five Rivers MetroParks Ranger Chief Larry Jones said law enforcement has responded to six instances of trespassing on those fields.

"We just had to give people some warnings to leave that area," Jones said.

To counter the invasion, the city last month installed a sophisticated \$7,700 zoom lens observation camera that scans for intruders.

The sharp-eyed sentry works night and day, and unauthorized visitors can expect to find themselves in the clutches of the police if they ignore the warning signs, said Martha Schwendeman of the city's Division of Water Supply and Treatment.

There is the option to use the camera to transmit images of the eagles, and a photo of the nest is at cityofdayton.org/departments/pa/Pages/EagleWebcam.aspx.

City water employees have named the adult eagles "Jim and Cindy," to honor the late Jim Kennedy, a 34-year department employee, and his wife.

EDITOR'S NOTE: This story has been updated to reflect the correct price of the security camera installed at the city's Mad River well field is about \$7,700. Another security system to deter vandalism and trespassing at Dayton Water Department facilities cost \$34,141. Both items were paid for using Water Department funds.

Find this article at:

<http://www.daytondailynews.com/news/dayton-news/city-trying-to-protect-privacy-of-bald-eagle-family-118853.html>

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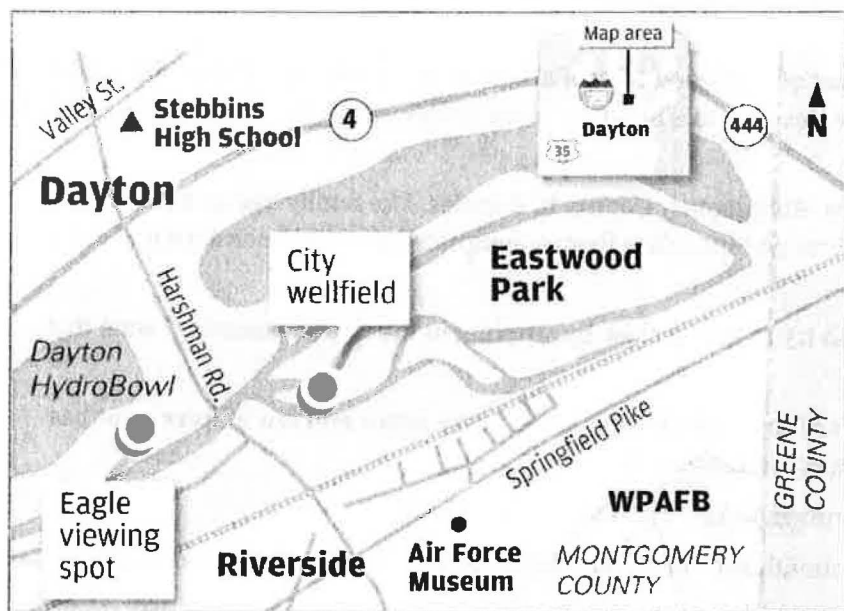
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Dayton Daily News

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STAFF MAP

Signs tell visitors where to park and how to point their binoculars to view the nest. Park hours are 8 a.m. to 10 p.m.

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072209 FWS eagle consult and response.txt

-----Original Message-----

From: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
Sent: Wednesday, July 22, 2009 2:08 PM
To: Melanie_Cota@fws.gov
Cc: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY; Helton, John M Civ USAF AFMC 88ABW/CEVS; Keenan, Kristen A Civ USAF AFMC 88 ABW/CEVO; Mitchell, Brittney N Civ USAF AFMC 88 ABW/CEVO
Subject: FW: Nesting Eagles

Melanie,

During the review of the draft Environmental Assessment for the EOD Range. There was a question asked regarding impacts to nesting eagles near the base. There was a pair of nesting eagles recently sited at the Dayton wellfield southwest of Area C of the base. Below is the response from ODNR. Does USFWS have any comments or concerns?

Thanks,
Karen

-----Original Message-----

From: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
[mailto:Karen.Beason@wpafb.af.mil]
Sent: Thursday, July 16, 2009 4:52 PM
To: Mitch, Brian
Cc: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY
Subject: Nesting Eagles

Good Afternoon Brian,

Wright-Patterson is in the process of Finalizing an Environmental Assessment for the location of a an Explosive Ordinance Disposal (Range). Initial coordination with ODNR occurred in October of 2008 (see attached). Since that time there has been a pair of nesting eagles identified in the Dayton wellfield southeast of the base. Are there any state guidelines regarding the protection of nesting eagles (i.e. safe distance, etc.). I will provide additional information as needed.

Thanks,
Karen

Natural Resources Manager
88 ABW/CEVO
(937)257-5899

-----Original Message-----

From: Mitch, Brian [mailto:Brian.Mitch@dnr.state.oh.us]
Sent: Wednesday, July 22, 2009 1:50 PM
To: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
Subject: RE: Nesting Eagles

Karen,

This is in response to your e-mail requesting information regarding bald eagles for the Environmental Assessment for Wright Patterson AFB. Attached are two documents providing guidance on how to avoid impacts to bald eagle nests. I suggest you also contact the U.S. Fish and Wildlife Service Ecological Services Office at (614)416-8993.

Brian Mitch, Environmental Review Manager Ohio Department of Natural Resources Environmental Services Section

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8/13/2009

FWS Reponse



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

August 13, 2009

Raymond Baker
88 ABW/CEVY
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH, 45433

TAILS: 2009-TA-0606

TAILS: 2009-FA-0033

Re: WPAFB Explosive Ordnance Disposal (EOD) Range, Greene County, OH

Dear Mr. Baker:

This is in response to your August 5, 2009 letter requesting the U.S Fish & Wildlife Service concurrence on Section 7 of the Endangered Species Act that the proposed project located in within the Wright Patterson Air Force Base in Greene County, Ohio will have no effect on the **Indiana bat** (*Myotis sodalis*), **snuffbox** (*Epioblasma triquetra*), and **clubshell** (*Pleurobema clava*) mussels and may affect, is not likely to adversely affect the **eastern massasauga** (*Sistrurus catenatus catenatus*). A draft EA was received on April 7, 2009 for the proposed Explosives Ordnance Disposal Proficiency Training and Emergency Disposal Range project and technical assistance comments were provided from the Service in a letter dated March 18 and May 6, 2009 on the four potential alternative locations for the proposed project. In addition to this, the Service made a site visit to WPAFB to inspect the 4 potential EOD alternative site locations on April 7, 2009. We understand the WPAFB has selected the Skeel Avenue as the preferred site for the proposed project. This site is located within the Huffman Prairie and this project proposes to impact approximately 16 acres of prairie habitat on the NE edge of Huffman Prairie. We understand that there are no wetlands or streams present within the project area.

According to your information, the EOD operations involve providing proficiency training to EOD personal. We understand the maximum operations would be conducted on average of 3 days/week, up to 8 hours/day setting up/training for the detonation of explosive materials. We understand the maximum number of detonations that would occur is 1 detonation per hour in an 8 hour period and infrequent night time training may occur. These detonations would be controlled within the confines of a 6' H x 46' L x 24' W, precast concrete containment structure to be erected at the proposed site. In addition, two small barriers, approximately 6' L x 6' W x 4' H to contain tools and explosives and a gravel access road and parking area is proposed to be constructed. According to your information, a 200' combustible free radius will need to be cleared of all vegetation and a 500' clear zone around the detonation site may need to be maintained with mowing.

The U.S. Fish and Wildlife Service recommends that proposed activities minimize water quality impacts and impacts to quality fish and wildlife habitat, such as forests, streams, and wetlands. Riparian zone habitat should be preserved wherever possible. Vegetated areas along streams and

rivers stabilize the banks, provide fish and wildlife habitat, filter pollutants and excess nutrients, store excess water during storm events, and minimize sedimentation. Best Management Practices (BMP's) should be utilized to minimize sedimentation and erosion. All disturbed areas should be mulched and revegetated with native woody and herbaceous species.

ENDANGERED SPECIES COMMENTS: The proposed project lies within the range of the **Indiana bat** (*Myotis sodalis*), a federally listed endangered species, **clubshell** (*Pleurobema clava*), a federally listed endangered freshwater mussel and the **snuffbox** (*Epioblasma triquetra*), a Federal freshwater mussel of concern and an Ohio endangered species. You have determined the project will have no effect on these species therefore, no consultation is required.

The project lies within close proximity to a documented occurrence of the **eastern massasauga** (*Sistrurus catenatus catenatus*), a docile rattlesnake that is declining throughout its national range and is currently a Federal Candidate species. The snake is currently listed as endangered by the State of Ohio. Your proactive efforts to conserve this species now may help avoid the need to list the species under the Endangered Species Act in the future. Due to their reclusive nature, we encourage early project coordination to avoid potential impacts to massasaugas and their habitat

The eastern massasauga is known to be present within the WPAFB. We understand a presence/absence survey is currently being conducted by Jeff Davis for the 2009 season where historical records exist for the species in the Prime BEEF Training Area (PBTA) and Twin Base Golf Course (TBGC). All eastern massasauga populations in Ohio are small and isolated and are presumed to be declining at WPAFB due to habitat modification/removal. The Service is concerned with the close proximity of the proposed location and any potential impacts/fragmentation to this species and/or its habitat. After viewing the proposed site locations it appears that the Skeel Avenue site is surrounded by the most development and although it proposes to impact prairie habitat, we feel this site would be the least disruptive to this species and its habitat. During the site visit, this site was inspected for eastern massasauga habitat within the immediate location of the proposed EOD and the site appeared to lack suitable soils and burrows for this species. The proposed project plan of the 500 ft clear zone for the EOD would impact approximately 16 acres of the Huffman Prairie, which includes impacts to approximately 7.5 acres of the Huffman Prairie National Landmark.

We understand that WPAFB may be interested in doing a more comprehensive survey within the base of suitable habitat for this species and the Service appreciates and strongly supports this effort to manage and conserve this species. According to your information, WPAFB, as a proactive measure, has identified mitigation measures to minimize disturbance during construction and maintenance activities of the EOD range at this site. All actions within the WPAFB should be in compliance with the Integrated Natural Resource Management Plan (INRMP). We understand the following avoidance and minimization measures will be taken to protect this species and its habitat:

1. Construction of the EOD range site will be restricted to November 15-March 1, when snakes are dormant.
2. Prior to commencing construction of the EOD range, a visual survey for snakes will be performed by the Natural Resource personal or support staff. If snakes are located within the project area, the project must cease and the USFWS and ODNR must be contacted immediately.
3. Mowing of vegetation within the project area will be restricted to November 15-March 1, when snakes are dormant, or during overcast days when temperatures are less than 65 Degrees F, or during mid-day when temperatures are greater than 80 Degrees F, when

snakes would not be active. In addition to this, mower blades should be set no shorter than 8" to avoid any potential snakes.

4. Any prescribed burns of the Huffman Prairie and National Landmark will be conducted only during November 15- March 1, when snakes are dormant.
5. WPAFB will seek to mitigate for impacts to the Huffman Prairie by expanding and restoring the prairie in alternate directions with preference given to connecting potential EMR habitat. This will provide connecting corridors for this species.

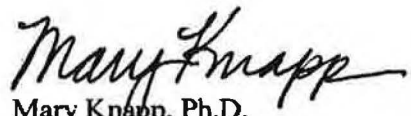
Due to the lack crayfish burrows and suitable soils within the project area, as well as the above mentioned avoidance and minimization measures, we concur that the project as proposed may affect, is not likely to adversely affect the eastern massasauga.

This concludes consultation on this action as required by section 7(a)(2) of the Endangered Species Act. Should, during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the Service should be reinitiated to assess whether the determinations are still valid.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy.

If you have questions, or if you would like to set up a site visit, please contact Melanie Cota at extension 15 in this office or by email at Melanie_Cota@fws.gov or visit our website at <http://www.fws.gov/midwest/Ohio/>.

Sincerely,


Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

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9/1/2009

WPAFB Consultation Request



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

1 September 2009

88 ABW/CEVO
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Dr. Mary Knapp
U.S. Department of Interior
U.S. Fish & Wildlife Service
4625 Morse Rd, Suite 104
Columbus OH 43230

Subject: Section 7 Endangered Species Consultation – Follow-up
Proposed Explosives Ordnance Disposal Range
Wright Patterson Air Force Base
Greene County, Ohio

Dear Dr. Knapp:

This letter is a follow-up to your letter of August 13, 2009, regarding the proposal to construct an Explosive Ordnance Disposal Range here on Wright-Patterson Air Force Base. First, thank you for your quick response and for your continued cooperation in working with us regarding endangered species on the installation. We appreciate your comments on endangered species. However, we need to ask for reconsideration for some of the avoidance and mitigation measures initially proposed in our August 5 letter and concurred with in your letter.

We concur with you that the Skeel Avenue site would be the least disruptive to the eastern massasauga rattlesnake. However, in reviewing your letter, we determined that we need two of the measures to be amended. Currently the first measure calls for us to limit construction at the proposed EOD range site to the period November 15 through March 1. The only construction planned at the site is the placement of concrete footers for the blast enclosures; we cannot pour concrete during the winter months. Therefore we need an expanded window for construction. The second measure that we need to amend pertains to Huffman Prairie. As you are aware, the Skeel Avenue site overlaps the boundaries of Huffman Prairie. Our dilemma with this site is how to best balance management of the prairie with minimizing potential impacts to eastern massasauga habitat. In proposing our avoidance and mitigation measures to you in our August 5 letter, we neglected to fully consider the prairie in the equation. One of the measures we proposed called for limiting prescribed burns of Huffman Prairie to the period November 15 to March 1, when the eastern massasauga are dormant. Unfortunately, we had not checked with the Division of Forestry at the Ohio Department of Natural Resources, which partners with us on prairie burns, first, to confirm that this window is appropriate for best management of the prairie. They have now told us that we need a slightly expanded window, in order to include the season where we can ensure that we are burning the emergent woody vegetation that we need to remove from the prairie.

Therefore, we ask that you consider amending these two avoidance and mitigation measures as follows:

1. Construction of the EOD range site will be ~~restricted to November 15 – 1 Mar~~ *kept to a minimum except for months when snakes are dormant (November – February).*
4. Any prescribed burns of the Huffman Prairie ~~and National Natural~~ Landmark will be conducted only during *the period October 1 – March 30.* ~~November 15 – March 15, when snakes are dormant.~~

Thank you for your consideration. We look forward to your response. If you have any questions, please contact me by email at janet.ferguson@wpafb.af.mil or at (937) 257-5528.

Sincerely



JAN FERGUSON
Chief, Operations Branch
Environmental Management Division

cc: Jeff Jones/ Tetra Tech
Melanie Cota, USFWS

9/25/2009

WPAFB Consultation Request



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

25 September 2009

88 ABW/CEVO
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Dr. Mary Knapp
U.S. Department of Interior
U.S. Fish & Wildlife Service
4625 Morse Rd, Suite 104
Columbus OH 43230

Subject: Section 7 Endangered Species Consultation – Addendum
Proposed Explosives Ordnance Disposal Range
Wright Patterson Air Force Base
Greene County, Ohio

Dear Dr. Knapp:

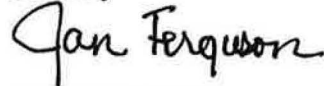
This letter is an addendum to our letter of September 1, 2009, regarding the proposal to construct an Explosive Ordnance Disposal Range here on Wright-Patterson Air Force Base, and some of the avoidance and mitigation measures that have been proposed by our two offices to protect endangered species on the installation. In that letter we concurred with you that the Skeel Avenue site would be the least disruptive to the eastern massasauga rattlesnake, but we requested that two of the avoidance and mitigation measures be amended. We wish to amend our discussion of these two measures as follows:

a. Construction: Currently the first measure calls for us to limit construction at the proposed EOD range site to the period November 15 through March 1. The only construction planned at the site is the placement of concrete footers for the blast enclosures. Our September 1 letter stated that we cannot pour concrete during the winter months. Ms. Melanie Cota of your office requested that we clarify why this is the case. While it is technically feasible to pour concrete in the winter, it is accepted construction practice to avoid doing so once the temperature drops below 50 degrees. Cold temperatures affect the curing of concrete, as does frozen ground. Due to the extremely limited nature of the construction involved in this project, we request an expanded window for construction. Any extension of the dates you are able to grant would be helpful.

b. Prairie Burn: Our September 1 letter discussed our need to best balance management of Huffman Prairie with minimizing potential impacts to habitat for the eastern massasauga rattlesnake (EMR). In our letter we suggested that our preferred window for prairie burns would be the period October 1 to March 30. Since that letter we have received more information from Ms. Cota, and we have received further guidance from the Ohio Department of Natural Resources, Environmental Reviews Section, and Mr. Jeff Davis. Mr. Davis and ODNR have indicated that we would avoid impacts to the EMR if we performed the prairie burns in late October or November. Therefore we would like to revise our prairie burn timeframe to the period October 20 to 15 March. This would limit prairie burns to when the snakes are most likely to be dormant, while still allowing us to remove woody vegetation from the prairie.

Thank you for your consideration. We look forward to your response. Should you or your staff have any questions, please contact me by email at janet.ferguson@wpafb.af.mil or at (937) 257-5528.

Sincerely

A handwritten signature in black ink that reads "Jan Ferguson". The signature is written in a cursive style with a large, stylized "J" and "F".

JAN FERGUSON
Chief, Operations Branch
Environmental Management Division

cc:

Melanie Cota, USFWS

Jeff Jones/ Tetra Tech

10/2/2009

FWS Response



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

October 2, 2009

Jan Ferguson
88 ABW/CEVO
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433

TAILS: 2010-TA-0002

TAILS: 2009-I-1041

TAILS: 2009-FA-0033

Re: Section 7 Endangered Species Consultation-Amendment
Explosive Ordnance Disposal (EOD) Range, Greene County, OH

Dear Ms. Ferguson:

This is in response to your September 1 and 23, 2009 letters requesting the U.S Fish & Wildlife Service amend two avoidance and minimization measures for the eastern massasauga (*Sistrurus catenatus catenatus*) that were listed in our August 13, 2009 Section 7 concurrence letter for the proposed EOD project within the WPAFB. The Service greatly appreciates the efforts proposed by DoD to avoid and minimize impacts to this species. The Service also recognizes that these conservation actions are at this time voluntary, due to the current Candidate listing of the species. We understand the Skeel Avenue site was selected for the EOD Range and that this site overlaps the boundary of the Huffman Prairie. We understand that survey efforts this season have not detected any massasaugas within the historical locations of the base. However, please be aware that this may not be an indication that the species is absent, but that more survey efforts in that area or other suitable habitat on the base may need to be conducted to determine presence/absence. Please note the following is an amendment from the agreed upon avoidance and minimization measures outlined in our August 13, 2009 concurrence letter.

According to your information, you wish to amend the construction dates from November 15-March 1, so that concrete can be poured for the concrete footers for the blast enclosures. The Service does not object to this limited amount of construction outside of this timeframe. However, prior to construction, we request the surrounding area be mowed to make it less attractive to snakes. This should be done during overcast days when temperatures are less than 65 Degrees F, or during mid-day when temperatures are greater than 80 Degrees F, when snakes would not be active.

According to your information, you also wish to expand the dates for burning the Huffman Prairie from November 15- March 1 to an expanded window of October 20-March 15 to ensure burning emergent woody vegetation. We understand that ODNR, DOW along with Jeff Davis, who is currently surveying the base for this species, agree that burning should take place late October -- early November to avoid impacts to this species, and the Service concurs with these dates. While the Service agrees that the Huffman Prairie needs to be managed by way of burning to limit encroachment of woody species and maintain habitat for the species, we also recognize this as a

major threat to the species. We request that burning times be scheduled as close to October 30 (or after) as possible to avoid potentially harming snakes. Due to fluctuation in temperatures, we feel this date would better protect the species in the event of a warm period in the fall. In addition, we do not object to expanding the spring burn date to March 15. We understand the prairie is burned with alternating sections annually and this should also minimize any potential impacts to the species.

This concludes consultation on this action as required by section 7(a)(2) of the Endangered Species Act. Should, during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the Service should be reinitiated to assess whether the determinations are still valid.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy.

If you have questions, or if we may be of further assistance in this matter, please contact Melanie Cota at extension 15 in this office or by email at Melanie_Cota@fws.gov or visit our website at <http://www.fws.gov/midwest/Ohio/>.

Sincerely,


Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

Ohio Department of Natural Resources (ODNR)

Date	Nature of Correspondence	Consultation Issues				Outcome
		Sandhill Site	Former EOD Site	Hebble Creek Road Site	Skeel Avenue Site	
9/22/2008	WPAFB Consultation Request	Formal request for consultation on Alternatives 1 - 3				
10/1/2008	ODNR Response	<u>Potentially Threatened Species</u> , 1 Mile Radius: Great Plains Ladies Tresses	<u>Endangered Species</u> , 1 & 5 Mile Radius Eastern Massasauga Rattler; Beers noctuid; Indiana bat (5 miles) <u>Potentially Endangered Species</u> , 1 Mile Radius: Lesser Ladies Tresses <u>Species of Concern</u> , 1 Mile Radius: Sedge Wren	<u>Potentially Threatened Species Identified</u> , 1 Mile Radius: Great Plains Ladies Tresses		No specific guidance; default to FWS consultation
3/6/2009	WPAFB Consultation Request				Formal request for consultation on Skeel Ave Alternative	
3/12/2009	ODNR Response				<u>Endangered Species Identified</u> : 1 Mile Radius: Beers noctuid <u>Species of Concern</u> , 1 Mile Radius: Sedge Wren	No specific guidance; default to FWS consultation
7/16/2009	WPAFB Consultation Request (e-mail)	07/16/09: Consultation on emergent issue of nesting eagle pair that arrived after completion of Draft EA				
7/22/2009	ODNR Response (e-mail)	07/22/09: Correspondence from ODNR providing guidance to assist in avoiding impact to eagles				Presence of pair not asserted to pose a significant impact

Addition of Skeel Avenue to consultation request

9/22/2008

WPAFB Consultation Request



September 22, 2008

Debbie Woischke
Ohio Department of Natural Resources
Division of Natural Areas and Preserves
Natural Heritage Data Services
2045 Morse Road, Building F-1
Columbus, Ohio 432296693

Subject: Rare Species Data Request and Informal Consultation
Environmental Assessments
Wright Patterson AFB
Greene County, Ohio

Dear Ms. Woischke:

Wright-Patterson AFB is preparing two Environmental Assessments for two projects designed to support training efforts on the base.

The first EA will evaluate the proposed construction and operation of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range. The proposed locations for the EOD range are

- I. Former EOD range (Area C of WPAFB)
- II. Property north of Hebble Creek Road and west of the Huffman Prairie Flying Field (Area C of WPAFB); and
- III. Sand Hill (north of Area C of WPAFB).

The second EA will evaluate the proposed National Air and Space Intelligence Center (NASIC) and the U.S. Air Force School of Aerospace Medicine Expeditionary Medical Support (USAFSAM EMEDS) field training activities at the former Aircraft Battle Damage and Repair (ABDR) Facility site.

As part of these assessments, we would like to request the locations of known populations of rare, threatened and endangered species within a one mile radius of the project sites. For the Indiana bat, we would like to request information within a five mile radius. A Natural Heritage Data Request form is enclosed. We would also like to request informal consultation regarding the possible impacts of the projects on species listed as threatened or endangered in accordance with Section 7 of the Endangered Species Act.

The first EA (1), EOD operation, involves providing proficiency training to EOD personnel. At worse case this involves 2 days/week, 4 hours/day of training. The 4 hours involve setting up/training for the detonation of explosive materials (maximum explosive material detonated is five pounds C4 at one time). The actual detonation/explosion takes less than one second. The "clear" zone around the detonation site is a 500 feet radius. The detonations will be performed inside a walled containment barrier, most likely concrete. On an emergency basis only, this site will also be used to detonate unexploded ordnance that come from the base or also from the public; this is a random occurrence with a frequency of maybe once/month. This project would involve constructing a precast concrete barrier six feet tall, approximately 46 feet long x 24 feet wide, with two open entrances. Two smaller barriers (approximately 6 feet long x 6 feet wide x 4 feet high) to contain tools and explosive materials, and a gravel access road and parking area would also be constructed.

The second EA (2) involves utilizing the existing facility of former ABDR, and minor site improvements for mobile medical facility training. Only personnel and portable equipment, such as generators and medical equipment, would be used at this site.

The attached maps provide information on location of the alternatives considered. Known locations of wetlands and potential endangered species habitats in the vicinity of the alternative site locations are provided in the attached maps.

Sincerely,

Jeff Jones
Project Manager

CC:

Enclosures: USGS quadrangle map
Aerial Photo map
Wetlands and Endangered Species Habitat map
Natural Heritage Data Request



DATA REQUEST FORM

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF NATURAL AREAS AND PRESERVES
OHIO NATURAL HERITAGE PROGRAM
2045 MORSE RD., BLDG. F-1
COLUMBUS, OHIO 43229-6693
PHONE: 614-265-6453; FAX: 614-267-3096

INSTRUCTIONS:

Please complete both sides of this form, sign and return it to the address or fax number given above along with: **(1)** a brief letter describing your project, and **(2)** a map detailing the boundaries of your project site. A copy of the pertinent portion of a USGS 7.5 minute topographic map is preferred but other maps are acceptable. Our turnaround time is two weeks, although we can often respond more quickly. If you fax in your request you do not need to mail the original unless otherwise requested.

FEES:

Fees are determined by the amount of time it takes to complete your project. The charge is \$50.00 per half hour with a one hour minimum. A cost estimate can be provided upon request. An invoice will be included with our response.

WHAT WE PROVIDE: The Natural Heritage Database is the most comprehensive source of information on the location of Ohio's rare species and significant natural features. Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Records for the following will be provided from the Natural Heritage Database: plants and animals (state and federal listed species), high quality examples of natural plant communities, geologic features, breeding animal concentrations, and unprotected natural areas. In addition, we report locations for managed areas including federal, state, county, local and non-profit areas, as well as state and national scenic rivers. Natural Heritage Data can be provided in many formats, including GIS shapefiles, spreadsheets, printed reports or maps. A minimum one mile radius around the project site will automatically be searched. Because Natural Heritage data is sensitive information, it is our policy to provide only the data needed to complete your project.

Date: September 22, 2008

Company name: Tetra Tech, Inc.

Your name: Jeff Jones, Project Manager

Address: Dayton Project Office, 13 & G Street, Area B, AMC PO Box 33509

City/State/Zip: WPAFB, OH 45433

Phone: 937-254-7012 Fax: 937-254-6080

E-mail address: jj45322@aol.com

Project Name: Field Training Environmental Assessments

Project Number: _____

Project Site Address: Wright-Patterson Air Force Base

Project County: Greene County

Project Township: _____

Project site is located on the following USGS 7.5 minute topographic quad(s): _____

Fairborn, OH

Description of project: EAs for 1) Constructing and operating an explosives ordnance disposal (EOD) _
proficiency training and emergency disposal range; and 2) Field training operations conducted by the National
Air and Space Intelligence Center & US AF School of Aerospace Medicine Expeditionary Medical Support _

How do you want your data reported? Printed list and map X GIS shapefile _____

Other format (please specify): _____

Additional information required: _____

How will the information be used? The information will be referenced in Environmental Assessment.
Precise locations of any listed species will not be referenced in the documents, but only the distance
of the project from the sites, as necessary _____

I certify that data supplied by the Ohio Natural Heritage Program will not be published without crediting the ODNR Division of Natural Areas and Preserves as the source of the material. In addition, I certify that electronic datasets will not be distributed to others without the consent of the Division of Natural Areas and Preserves, Ohio Natural Heritage Program.

Signature _____

Date: _____

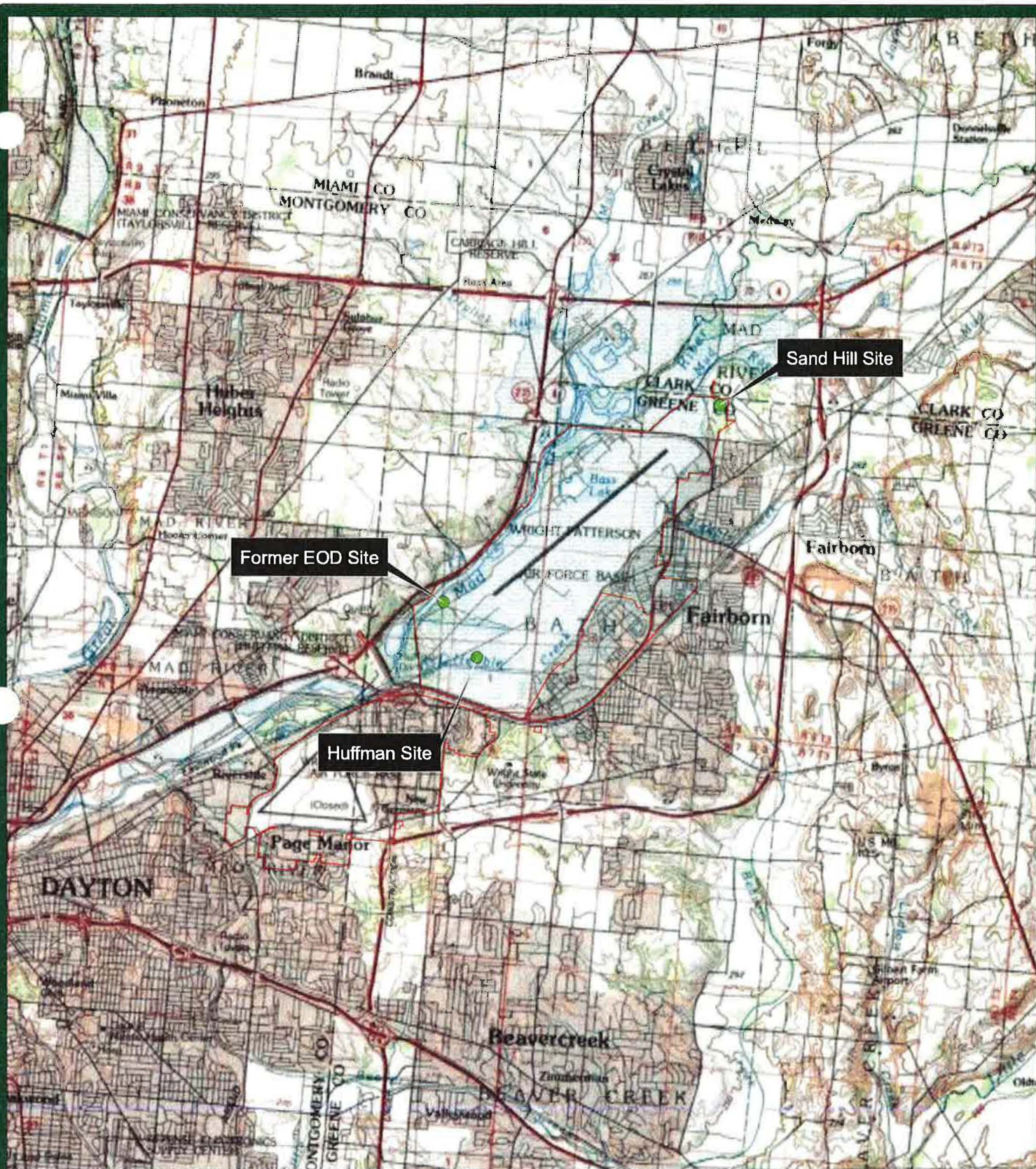
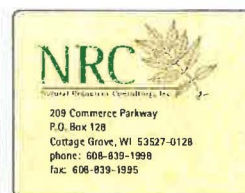
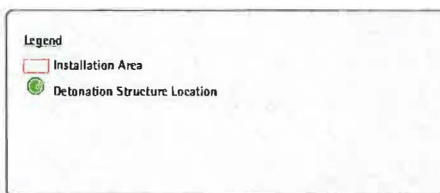
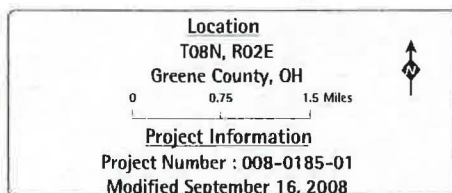


Figure 1. Project Location and Topography
Wright-Patterson Air Force Base

CONFIDENTIAL



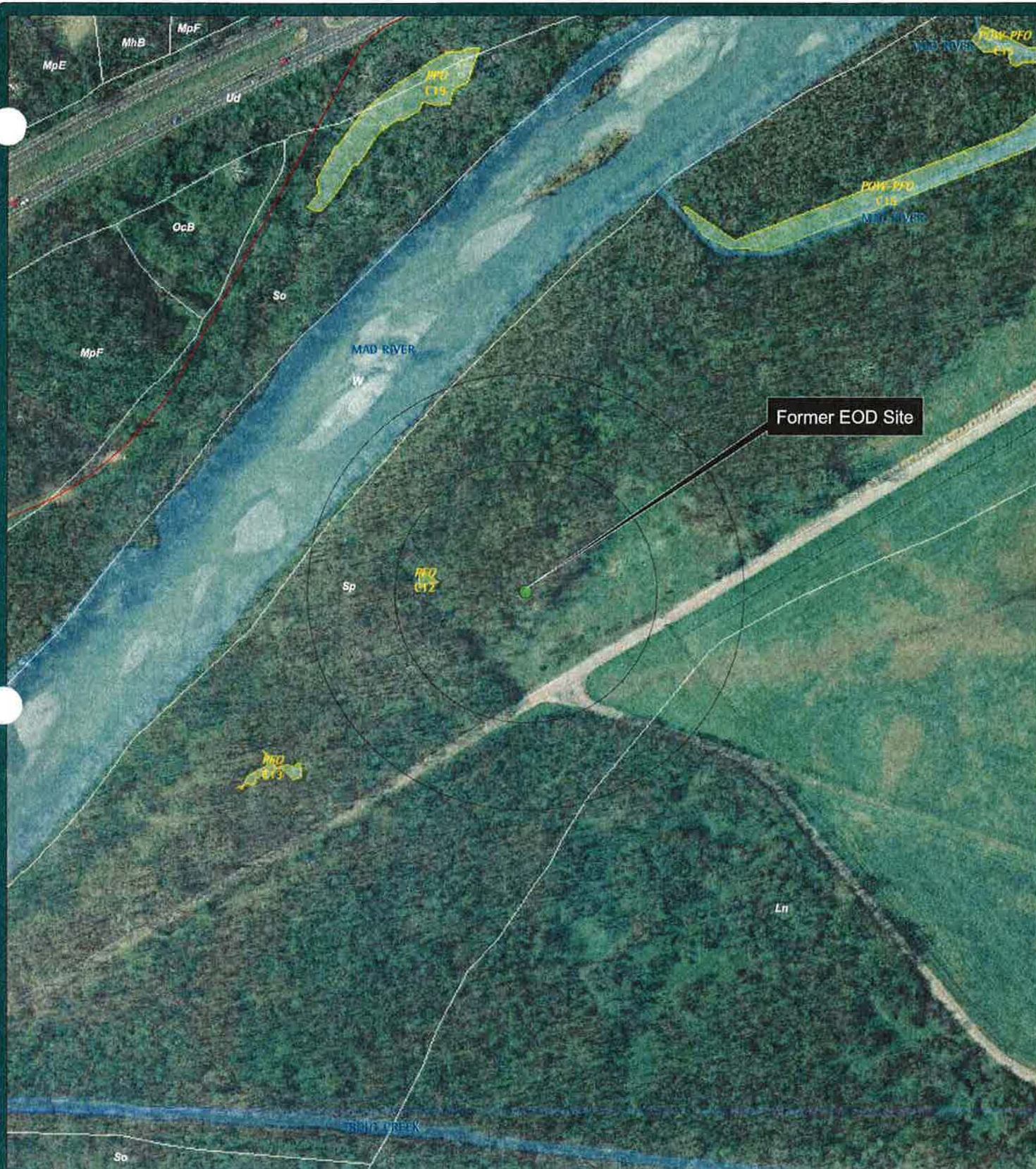


Figure 2. Environmental Features
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Wetland Area
- Environmental Restoration Site
- Soil Map Unit Area
- Waterway

NRC
Natural Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1985

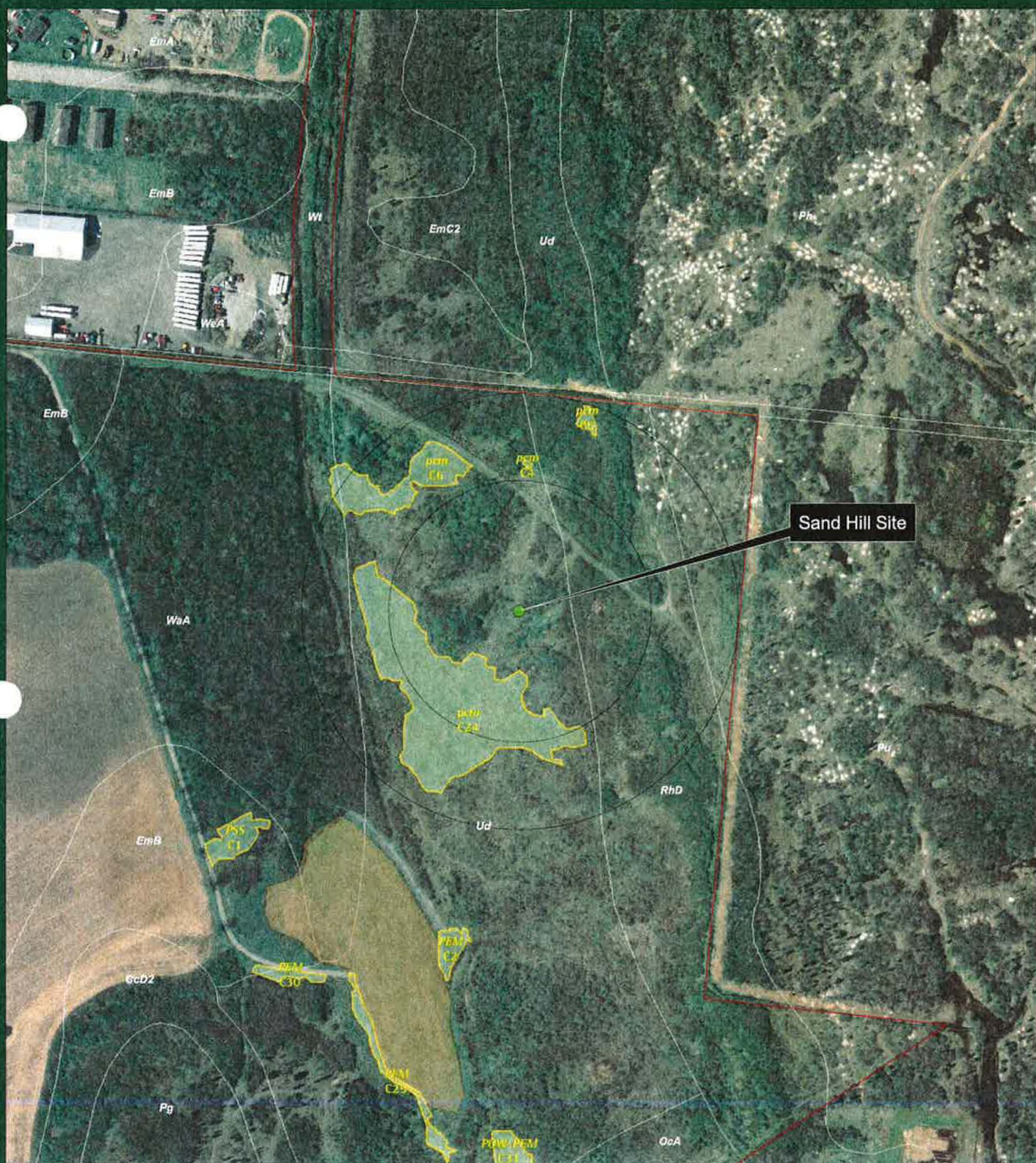


Figure 2. Environmental Features
Wright-Patterson Air Force Base

CONFIDENTIAL



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Wetland Area
- Environmental Restoration Site
- Soil Map Unit Area
- Waterway

NRC
Natural Resource Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995



Figure 2. Environmental Features
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Wetland Area
- Environmental Restoration Site
- Soil Map Unit Area
- Waterway

NRC
Natural Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995

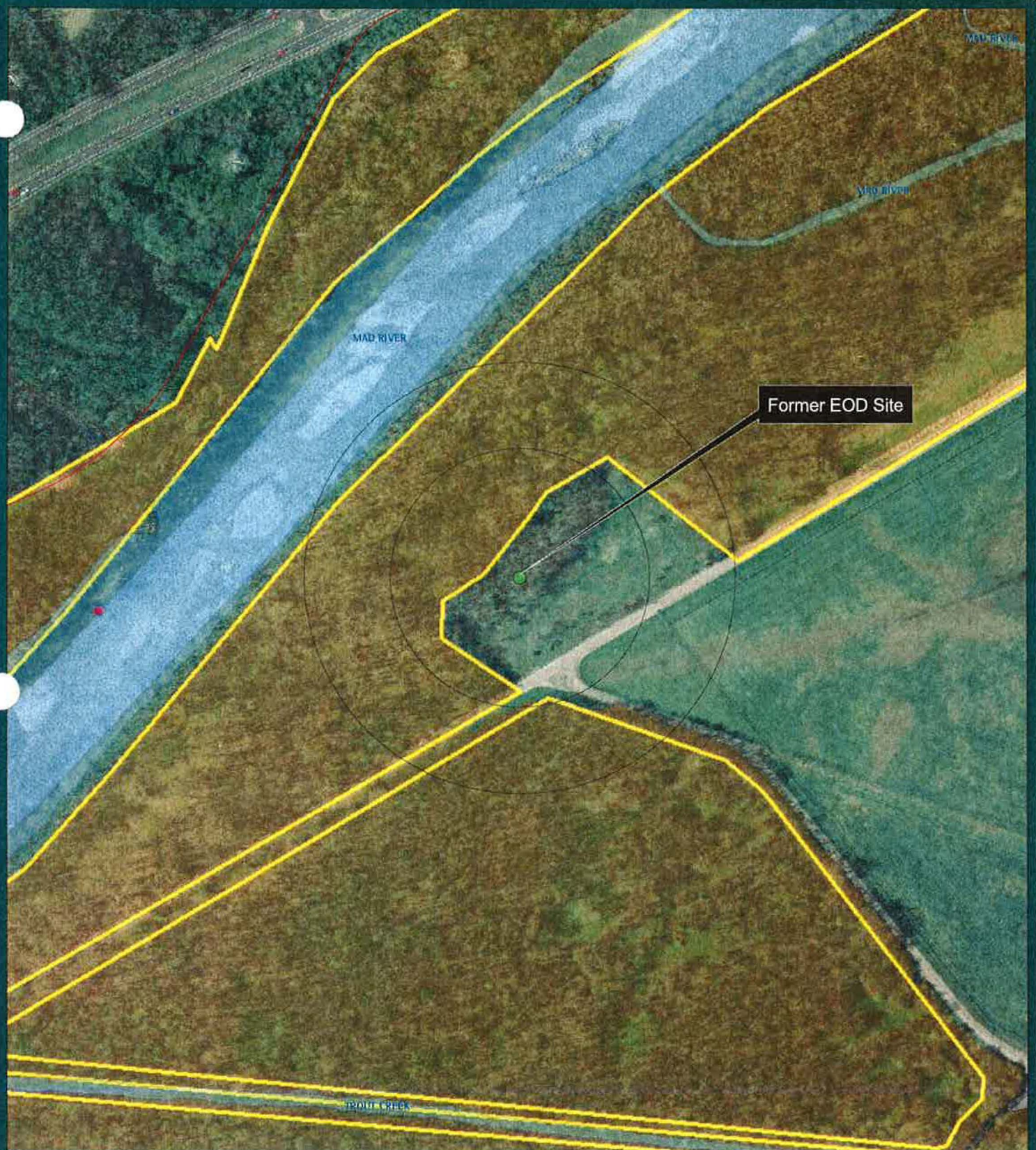


Figure 3a. Threatened and Endangered Species Occurrences
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Rare Plants
- Bald Eagle
- Blazing Star Stem Borer
- Clubshell
- Indiana Bat
- Upland Sandpiper
- East. Massasauga Snake
- Waterway

NRC
Natural Resource Consulting, Inc.

208 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995



Figure 3a. Threatened and Endangered Species Occurrences
Wright-Patterson Air Force Base

CONFIDENTIAL



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

Installation Boundary	Clubshell
Detonation Structure Location	Indiana Bat
Detonation Structure Buffer (300 and 500 ft)	Upland Sandpiper
Rare Plants	East. Massasauga Snake
Bald Eagle	Waterway
Blazing Star Stem Borer	

NRC
Natural Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995



Figure 3a. Threatened and Endangered Species Occurrences
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

Installation Boundary	Clubshell
Detonation Structure Location	Indiana Bat
Detonation Structure Buffer (300 and 500 ft)	Upland Sandpiper
Rare Plants	East. Massasauga Snake
Bald Eagle	Waterway
Blazing Star Stem Borer	

NRC
National Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995



Figure 3b. Threatened and Endangered Species Habitat
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 FT)
- Bird Habitat Area
- Waterway

NRC
National Resource Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995



Figure 3b. Threatened and Endangered Species Habitat
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Bird Habitat Area
- Waterway

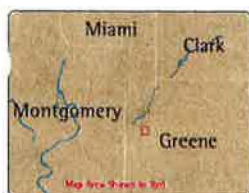
NRC
Natural Resources Consulting, Inc.

208 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995



Figure 3b. Threatened and Endangered Species Habitat
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Bird Habitat Area
- Waterway

NRC
National Resource Consulting, Inc.

208 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-439-1998
fax: 608-439-1996



Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR

SEAN D. LOGAN, DIRECTOR

Division of Natural Areas and Preserves

Steven D. Maurer, Chief

2045 Morse Rd., Bldg. F-1

Columbus, OH 43229-6693

Phone: (614) 265-6453; Fax: (614) 267-3096

October 1, 2008

Jeff Jones
Tetra Tech, Inc.
Dayton Project Office
13 & G St., Area B, AMC PO Box 33509
WPAFB, OH 45433

Dear Mr. Jones:

I have reviewed our Natural Heritage maps and files for the three proposed Field Training project sites, including a one mile radius at each site, at Wright-Patterson Air Force Base in Greene County, and on the Fairborn Quad. The search also includes a five mile radius for Indiana Bat (*Myotis sodalis*) records. The numbers/letters on the list below correspond to the areas marked on the accompanying maps. Common name, scientific name and status are given for each species. Status codes are defined as: E=endangered, P=potentially threatened, SC=species of concern and FE=federal endangered.

Fairborn Quad

Sand Hill Site

1. *Spiranthes magnicamporum* - Great Plains Ladies'-tresses, P
2. *Spiranthes magnicamporum* - Great Plains Ladies'-tresses, P

Former EOD Site & Huffman Site

- A. Huffman Metro Park - Five Rivers Metro Parks (4 parcels)
 - B. Dayton Aviation Heritage National Historical Park - National Park Service
1. *Myotis sodalis* - Indiana Bat, E, FE
 2. *Myotis sodalis* - Indiana Bat, E, FE
 3. *Myotis sodalis* - Indiana Bat, E, FE
 4. *Cistothorus platensis* - Sedge Wren, SC
 - Papaipema beeriana* - Beer's Noctuid, E
 5. *Myotis sodalis* - Indiana Bat, E, FE
 6. *Sistrurus catenatus* - Eastern Massasauga, E
 7. *Sistrurus catenatus* - Eastern Massasauga, E
 8. *Spiranthes ovalis* - Lesser Ladies'-tresses, P

There are no state nature preserves or scenic rivers at any of the three project sites. We are also unaware of any unique ecological sites, geologic features, animal assemblages, state parks, state forests or state wildlife areas within a one mile radius of any of the three project areas.



Jeff Jones
October 1, 2008
Page 2

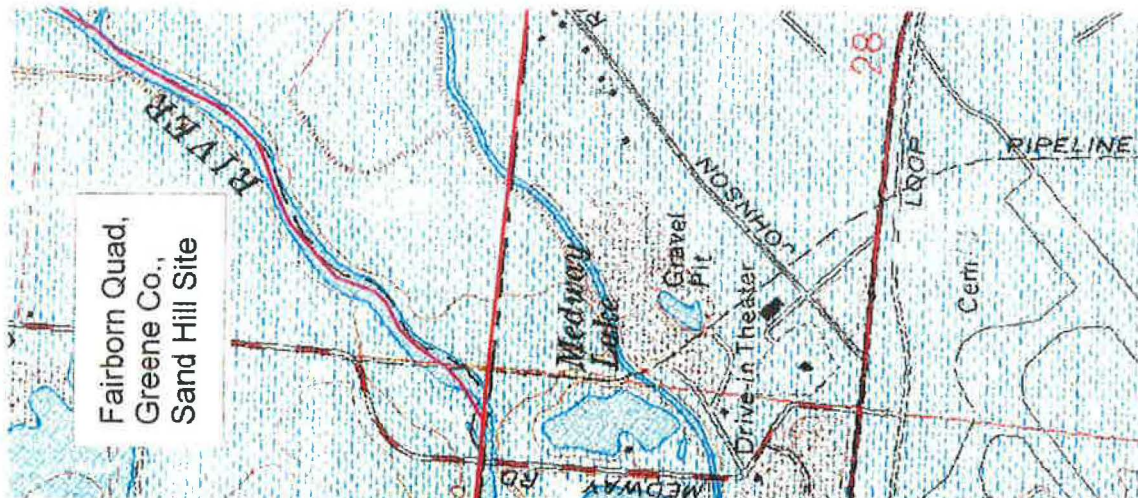
Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that although we inventory all types of plant communities, we only maintain records on the highest quality areas.

Please contact me at 614-265-6818 if I can be of further assistance.

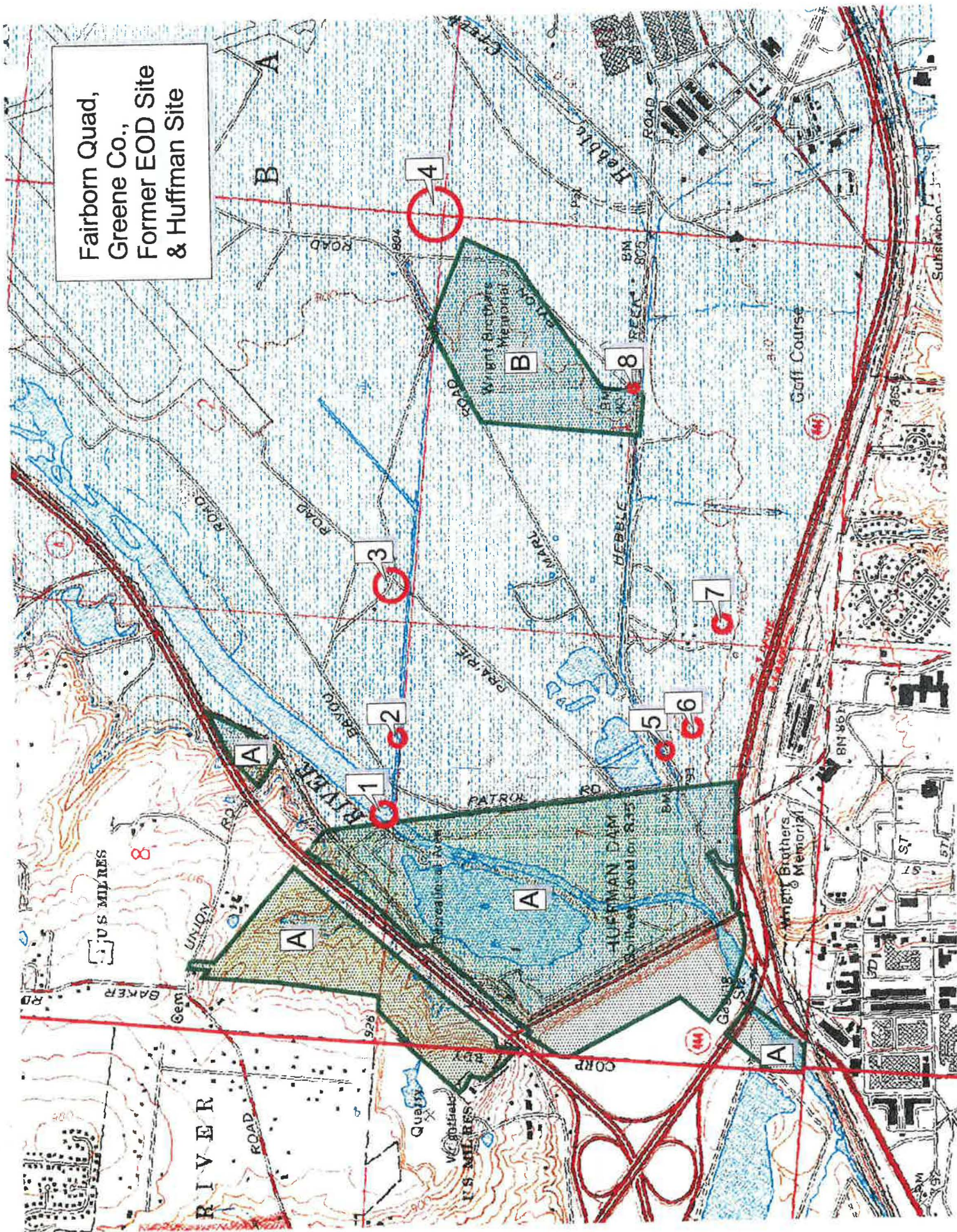
Sincerely,



Debbie Woischke, Ecological Analyst
Natural Heritage Program



Fairborn Quad,
Greene Co.,
Former EOD Site
& Huffman Site



INVOICE

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF NATURAL AREAS & PRESERVES
NATURAL HERITAGE DATA SERVICES
2045 MORSE ROAD, BUILDING F-1
COLUMBUS, OH 43229
(614) 265-6453

User Identification

Name: Tetra Tech, Inc.
Jeff Jones
Contact: Dayton Project Office
Address: 13 & G St., Area B, AMC PO Box 33509
WPAFB, OH 45433

Payment due by: 11-1-2008

Billing Date: 10-1-2008	Invoice Number: N2 11617	
Project (s): 3 Field Training sites at WPAFB - Sand Hill Site, Former EOD Site & Huffman Site	Heritage Services: manual search, data provided 2 hrs. at \$50.00/half hr.	Cost: 200.00
TOTAL		200.00

Please remit check or money order payable to "Division of Natural Areas & Preserves" within 30 days. If the invoice is not paid within 30 days, the amount will be certified with the Ohio Attorney General. Please return one copy of invoice with payment.

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3/6/2009

WPAFB Consultation Request



TETRA TECH

March 6, 2009

Debbie Woischke
Ohio Department of Natural Resources
Division of Natural Areas and Preserves
Natural Heritage Data Services
2045 Morse Road, Building F-1
Columbus, Ohio 43229-6693

Subject: Rare Species Data Request and Informal Consultation
Environmental Assessments
Wright Patterson AFB
Greene County, Ohio

Dear Ms. Woischke:

As you are aware from our previous correspondence dated September 22, 2008, Wright-Patterson AFB is preparing an Environmental Assessment for two projects designed to support training efforts on the base.

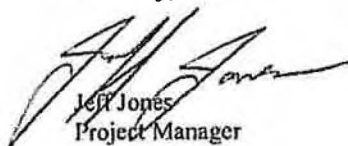
One of the assessments is intended to evaluate the proposed construction and operation of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range. In the above mentioned letter, we previously requested consultation on three individual prospective locations for this training operation. Since the time of our correspondence, we have identified a fourth potential location for EOD training activities which is identified as the Skeel Avenue Site (Area C of WPAFB).

As part of these assessments, we would like to request consultation on the locations of known populations of rare, threatened and endangered species within a one mile radius of this additional potential project site. For the Indiana bat, we request information within a five mile radius. A Natural Heritage Data Request form is enclosed. We would also like to request informal consultation regarding the possible impacts of the projects on species listed as threatened or endangered in accordance with Section 7 of the Endangered Species Act.

The proposed EOD operation, involves providing proficiency training to EOD personnel. At worse case this involves 3 days/week, 8 hours/day of training (this has been revised from what was originally stated in our September correspondence). The 8 hours involves setting up/training for the detonation of explosive materials (maximum explosive material detonated is 5 lbs C4 at one time). The actual detonation/explosion takes less than 1 second. The "clear" zone around the detonation site is a 500 foot radius. The detonations will be performed inside a concrete walled containment barrier. This site will also be used to detonate unexploded ordnance that come from the base or also from the public; this is a random occurrence with a frequency of maybe once/month.

The attached maps provide information on location of the Skeel Avenue alternative site under consideration. Known locations of wetlands and potential endangered species habitat in the vicinity of the alternative site location are provided in the attached maps.

Sincerely,



Jeff Jones
Project Manager

CC: Raymond Baker/WPAFB

Enclosures: USGS quadrangle map
Aerial Photo map
Wetlands and Endangered Species Habitat map
Natural Heritage Data Request

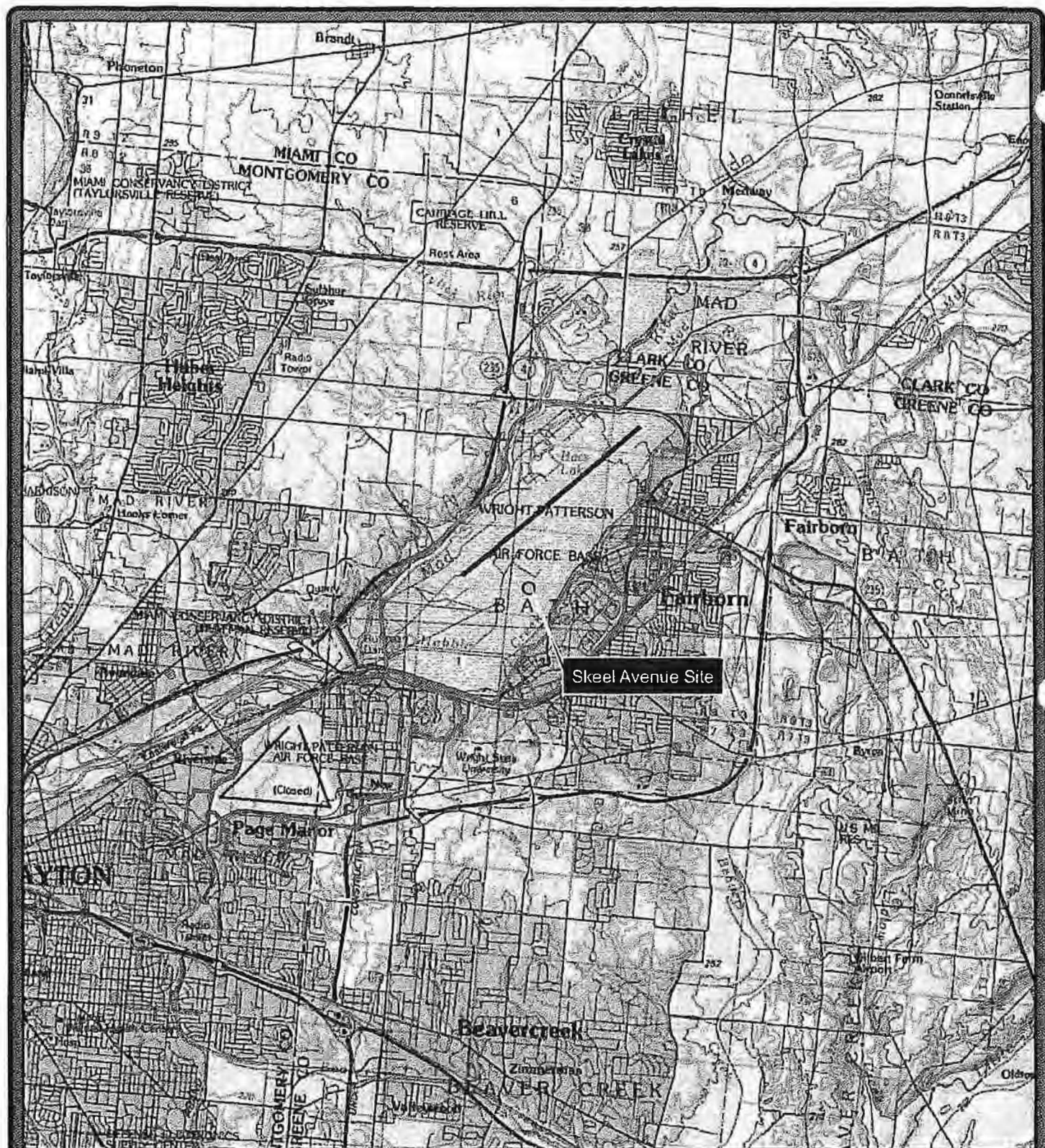


Figure 1. Project Location and Topography
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~

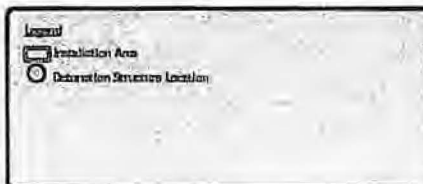
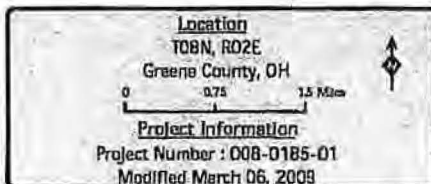
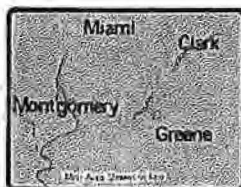




Figure 2. Environmental Features
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified March 05, 2009

Legend

- Detection Structure Location
- Combustible Free Zone (300 ft)
- Detection Structure Buffer (500 ft)
- Wetland Area*
- Environmental Restoration Site*
- Soil Map Unit Area
- Waterway

*Not Present In Data Frame

NRC
National Remediation Corporation, Inc.
259 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
Phone: 608-639-1999
Fax: 608-639-1995
www.nrc.com



Figure 3. Threatened and Endangered Species Occurrences
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified March 06, 2009

Legend

- Detonation Structure Location
- Combustible Free Zone (200 ft)
- Detonation Structure Buffer (500 ft)
- Blazing Star Stern Borer

NRC
National Resource Center
209 Courthouse Parkway
P.O. Box 128
Cottage Grove, WI 53521-0128
phone 608 820-1098
fax 608 820-1095
www.nrc.nrc.gov



DATA REQUEST FORM

OHIO DEPARTMENT OF NATURAL RESOURCES DIVISION OF NATURAL
AREAS AND PRESERVES

OHIO NATURAL HERITAGE PROGRAM 2045 MORSE RD., BLDG. F-1

COLUMBUS, OHIO 43229-6693

PHONE: 614-265-6453; FAX: 614-267-3096

INSTRUCTIONS:

Please complete both sides of this form, sign and return it to the address or fax number given above along with: (1) a brief letter describing your project, and (2) a map detailing the boundaries of your project site. A copy of the pertinent portion of a USGS 7.5 minute topographic map is preferred but other maps are acceptable. Our turnaround time is two weeks, although we can often respond more quickly. If you fax in your request you do not need to mail the original unless otherwise requested.

FEES:

Fees are determined by the amount of time it takes to complete your project. The charge is \$50.00 per half hour with a one hour minimum. A cost estimate can be provided upon request. An invoice will be included with our response.

WHAT WE PROVIDE

: The Natural Heritage Database is the most comprehensive source of information on the location of Ohio's rare species and significant natural features. Our inventory

Date: March 9, 2009

Company name: Tetra Tech, Inc.

Your name: Jeff Jones, Project Manager

Address: Dayton Project Office, 13 & G Street, Area B, AMC PO Box 33509

City/State/Zip: WPAFB, OH 45433

Phone: 937-254-7012 Fax: 937-254-6080

E-mail address: jj45322@aol.com

Project Name: Field Training Environmental Assessments

Project Number: _____

Project Site Address: Wright-Patterson Air Force Base

Project County: Greene County

Project Township: _____

Project site is located on the following USGS 7.5 minute topographic quad(s): _____

Fairborn, OH

Description of project: EA for Constructing and operating an explosives ordnance disposal (EOD)
proficiency training and emergency disposal range

How do you want your data reported? Printed list and map X GIS shapefile _____

Other format (please specify): _____

Additional information required: _____

How will the information be used? The information will be referenced in Environmental Assessment.
Precise locations of any listed species will not be referenced in the documents, but only the distance
of the project from the sites, as necessary

I certify that data supplied by the Ohio Natural Heritage Program will not be published without crediting the ODNR Division of Natural Areas and Preserves as the source of the material. In addition, I certify that electronic datasets will not be distributed to others without the consent of the Division of Natural Areas and Preserves, Ohio Natural Heritage Program.

Signature: [Signature]

Date: 03 March 09

3/12/2009

ODNR Response



Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR

SEAN D. LOGAN, DIRECTOR

Division of Natural Areas and Preserves

Steven D. Maurer, Chief

2045 Morse Rd., Bldg. F-1

Columbus, OH 43229-6693

Phone: (614) 265-6453; Fax: (614) 267-3096

March 12, 2009

Jeff Jones
Tetra Tech, Inc.
Dayton Project Offices,
13 & G St., Area B, AMC PO Box 33509
WPAFB, OH 45433

Dear Mr. Jones:

I have reviewed our Natural Heritage maps and files for the Skeel Ave. Field Training Range project area, including a one mile radius, at Wright-Patterson Air Force Base in Greene County, and on the Fairborn Quad. The numbers/letters on the list below correspond to the areas marked on the accompanying map. Common name, scientific name and status are given for each species. In addition, a five mile radius was searched for Indiana Bat (*Myotis sodalis*, federal endangered, state endangered) records. Those locations are shown on a second map.

Fairborn Quad

A. Dayton Aviation Heritage National Historical Park - National Park Service

1. *Cistothorus platensis* - Sedge Wren, species of concern
Papaipema beeriana - Beer's Noctuid, endangered

There are no state nature preserves or scenic rivers at the project site. We are also unaware of any geologic features, animal assemblages, state parks, state forests or state wildlife areas within a one mile radius of the project area.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that although we inventory all types of plant communities, we only maintain records on the highest quality areas.

Please contact me at 614-265-6818 if I can be of further assistance.

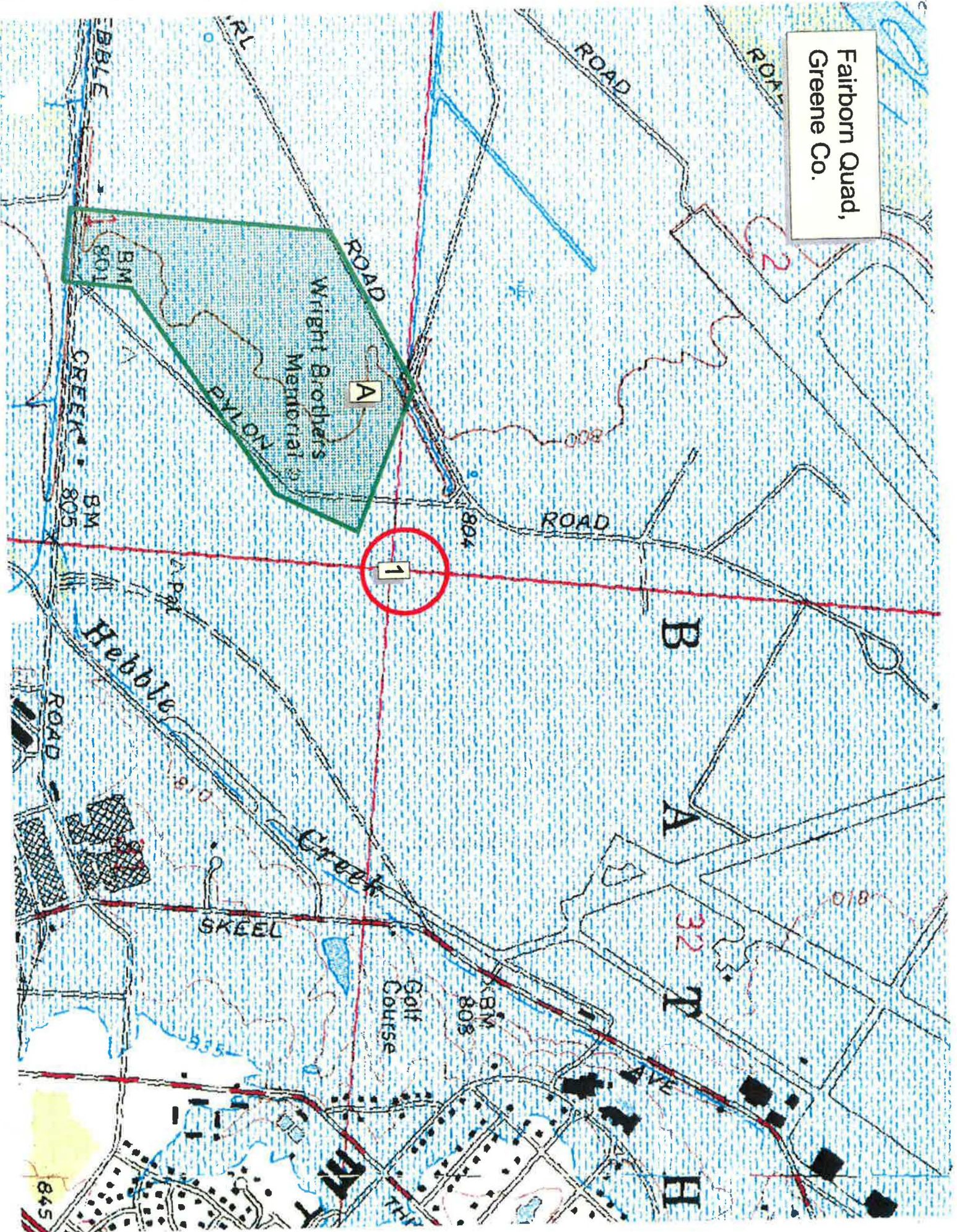
Sincerely,

A handwritten signature in blue ink, appearing to read "Debbie Woischke".

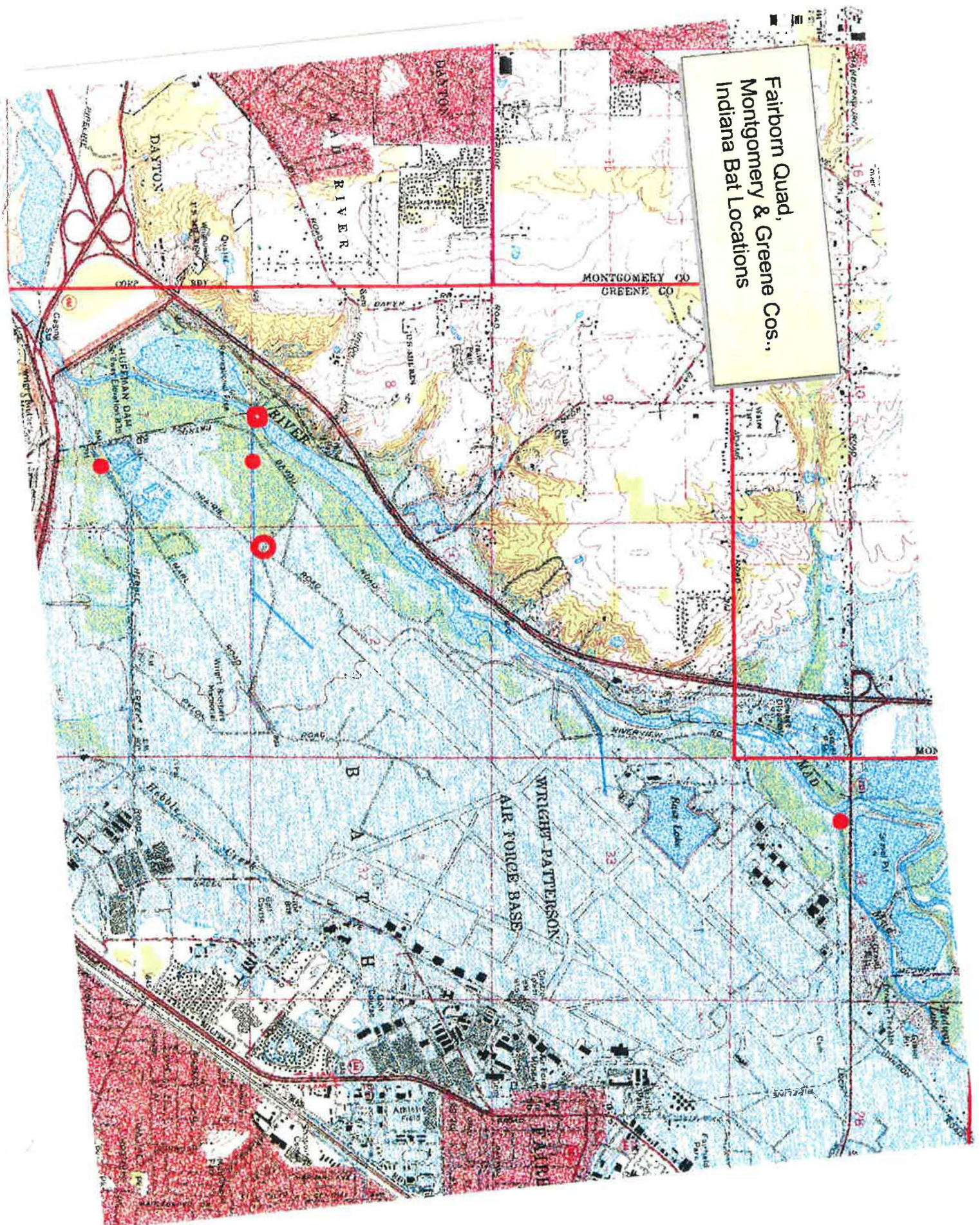
Debbie Woischke, Ecological Analyst
Natural Heritage Program



Fairborn Quad,
Greene Co.



Fairborn Quad,
Montgomery & Greene Cos.,
Indiana Bat Locations



7/16/2009

WPAFB Consultation Request (E-mail)

-----Original Message-----

From: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
[mailto:Karen.Beason@wpafb.af.mil]
Sent: Thursday, July 16, 2009 4:52 PM
To: Mitch, Brian
Cc: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY
Subject: Nesting Eagles

Good Afternoon Brian,

Wright-Patterson is in the process of Finalizing an Environmental Assessment for the location of a an Explosive Ordinance Disposal (Range). Initial coordination with ODNR occurred in October of 2008 (see attached). Since that time there has been a pair of nesting eagles identified in the Dayton wellfield southeast of the base. Are there any state guidelines regarding the protection of nesting eagles (i.e. safe distance, etc.). I will provide additional information as needed.

Thanks,
Karen

Natural Resources Manager
88 ABW/CEVO
(937)257-5899

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7/22/2009

ODNR Response (E-mail)

-----Original Message-----

From: Mitch, Brian [mailto:Brian.Mitch@dnr.state.oh.us]

Sent: Wednesday, July 22, 2009 1:50 PM

To: Beason, Karen N Civ USAF AFMC 88 ABW/CEVO

Subject: RE: Nesting Eagles

Karen,

This is in response to your e-mail requesting information regarding bald eagles for the Environmental Assessment for Wright Patterson AFB. Attached are two documents providing guidance on how to avoid impacts to bald eagle nests. I suggest you also contact the U.S. Fish and Wildlife Service Ecological Services Office at (614)416-8993.

Brian Mitch, Environmental Review Manager Ohio Department of Natural Resources Environmental Services Section

2045 Morse Rd., Building D-3

Columbus, OH 43229-6693

Office: (614) 265-6378

Fax: (614) 267-4764

brian.mitch@dnr.state.oh.us



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
6950 Americana Parkway, Suite H
Reynoldsburg, Ohio 43068-4127
(614) 469-6923 / FAX (614) 469-6919

April 24, 2008

Bald Eagle Protection and Management

On August 8, 2007, the bald eagle was removed from the Federal list of threatened and endangered species. Even though they are delisted, bald eagles are still protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act (Eagle Act). These Acts require some measures to continue to prevent bald eagle "take" resulting from human activities. These measures are very similar to the measures in place when the bald eagle was protected under the Endangered Species Act (ESA).

The Eagle Act prohibits anyone from **"taking"** bald eagles. "Take" under the Eagle Act is defined as to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. "Disturb" is the form of take that is most likely to occur and is the most ambiguous. Therefore, the U.S. Fish and Wildlife Service prepared National Bald Eagle Management Guidelines. These Guidelines not Federal regulations but are intended to provide information on how to avoid impacts to eagles for people who engage in recreation or land use. The guidelines are crafted to reflect the way that Federal and State managers interpret the Eagle Act and the Migratory Bird Treaty Act. The guidelines, for example, recommend buffers around nests when conducting activities that are likely to disturb bald eagles. These buffers are the same as those which were established while the bald eagle was protected under the ESA.

The three actions described below pertain to implementation of the Eagle Act.

- 1) The U.S. Fish and Wildlife Service finalized modifications to a regulatory definition of "disturb" under the Eagle Act:

<http://www.fws.gov/migratorybirds/issues/BaldEagle/DefinitionofDisturb.pdf>

- 2) The Service released the final National Bald Eagle Management Guidelines which provide guidance to the public on how to prevent impacts to bald eagles that could violate the Eagle Act.
<http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf>

- For the Upper Midwest, follow this link for an easy to use website that steps you through the Bald Eagle Management Guidelines:
<http://www.fws.gov/midwest/eagle/guidelines/index.html>

- 3) On June 5, 2007, the Service opened a 90-day public comment period on a proposal to create a permit program to authorize limited "take" of bald and golden eagles where the "take" is associated with, and not the purpose of, otherwise lawful activities. The comment period closed on September 4, 2007. http://www.fws.gov/midwest/eagle/baea_bgepa_pruleFR05june07.pdf

For additional information on the bald eagle, visit the Service's regional website:
<http://www.fws.gov/midwest/eagle/>

Please contact the Reynoldsburg, Ohio Field Office at (614) 469-6923 with any questions or concerns.

PROTECTION ZONES

Some activities close to a bald eagle nest may disturb the eagles when they are building their nests, sitting on eggs, and raising their young (Fig. 3). Other activities may change the habitat around the nest so that the eagles do not return to the nest the following year. On the following pages are recommendations for establishing Protection Zones around nest sites on your property. Three different Protection Zones are recommended for each nest site, and suggestions for ways you can avoid disturbing the eagles are listed. These Protection Zones should be established for nests currently being used and for alternate nest sites that have been used in the past three years.

Zone 1

Zone 1 is the area in which eagles are most sensitive to disturbance, and the greatest degree of protection is necessary. The boundary of this zone should be a minimum of 330 feet from the nest (Fig. 4).

Recommendations:

1. Year-round

These habitat changes should be prevented:

Timber cutting of any kind
Land clearing
Building, road, or trail
construction

2. February 1 to July 15

Unauthorized people should not be allowed in this zone. Foot traffic kept to an absolute minimum.

3. July 16 to August 15

Activity should be kept to a minimum.

Zone 2

Zone 2 covers an area in which the eagles are still sensitive to disturbance during the nesting season (February 1 to July 15), but less likely to be affected at other times of the year. The boundary of this zone should be a minimum of 660 feet from the nest (Fig. 4).

Recommendations

1. February 1 to July 15

Human activity should be kept to a minimum. Consult a wildlife manager.

2. July 16 to August 15

These activities are possible:

Hunting
Fishing
Hiking
Farming

3. August 16 to February 1

These activities are possible:

Standard farming practices
Maintenance of existing buildings
and roads
Hunting and trapping

Zone 3

Most activities are possible in Zone 3 outside of the breeding season. However, the management of this zone should include the protection of any bald eagle roosts or feeding sites in the area. The boundary of this zone should be a minimum of one-quarter mile from the nest (Fig. 4).

Recommendations

Activities in this zone that are within sight of the eagles on the nest may need to be conducted outside the breeding season. Consult a wildlife manager.

Management of roosts and feeding sites.

Protection zones

Mature live trees and dead trees necessary for perches and protection from the wind should be maintained in a zone 100 yards wide around each roost. This area should be closed to timber cutting and land clearing. Human activities within sight of the eagles should be restricted within 200 yards of the roost.

Shoreline

Land within 30 yards of the shoreline should be protected from timber cuts of one acre or more. As many dead trees as possible should be left standing, and trees with a diameter of 12 inches or greater left for use as perch trees. Recreational boating should be kept to a minimum within 100 yards of the shore, in areas identified as important feeding sites.

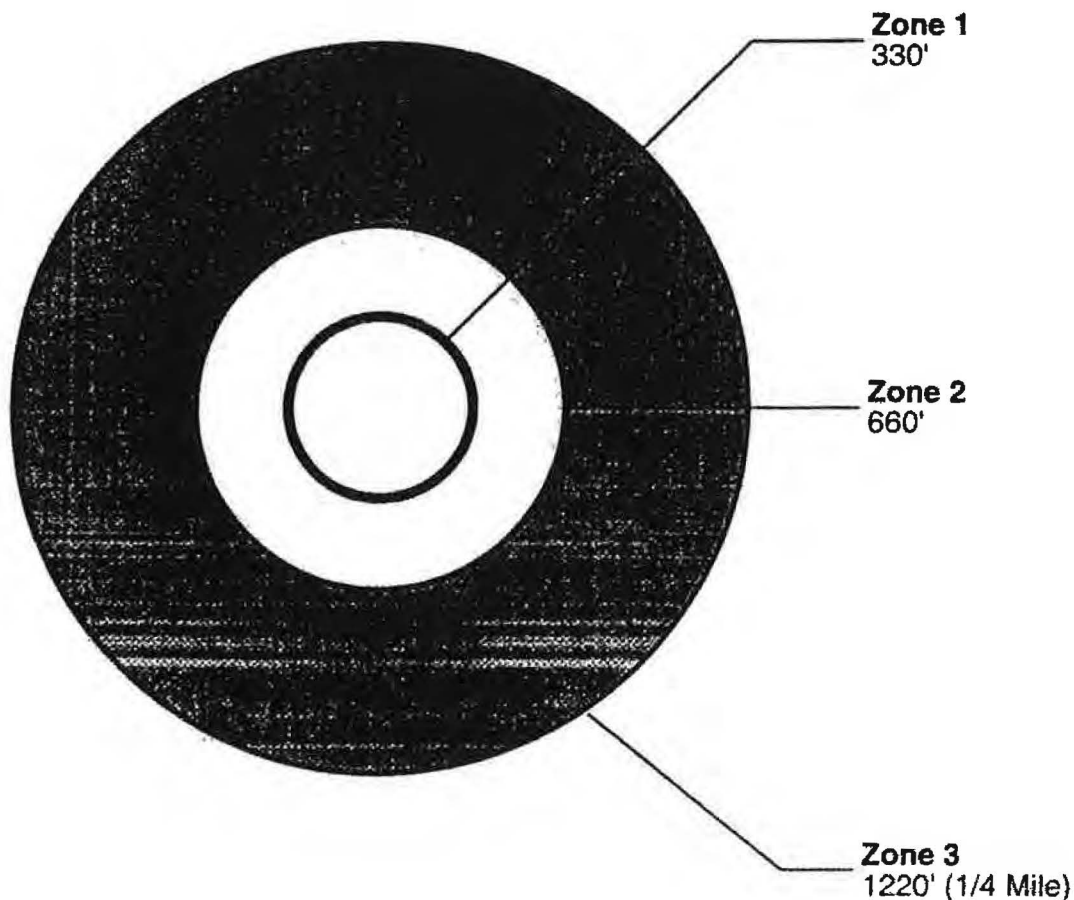


Fig. 4. Zones of protection for Ohio bald eagle nests.

National Parks Service

		Consultation Issues				Outcome
Date	Nature of Correspondence	Sandhill Site	Former EOD Site	Hebble Creek Road Site	Skeel Avenue Site	
Dayton Aviation Heritage National Historical Park						
10/24/2008	WPAFB Consultation Request	Formal request for consultation on Alternatives 1 - 3			Not included in request	
11/7/2008	NPS Response	No adverse comments	No adverse comments	1) Strongly oppose based on incompatibility with Cultural Landscape Report (2002) and the Huffman Flying Field General Management Plan Amendment (2007) 2) Cites decreased visitor access, noise and degradation of cultural landscape; Requests status as Cooperating Agency under NEPA		
Unknown	WPAFB transmittal of EA to NPS	Invitation to review and comment on EA for the 4 Alternatives				

National Parks Service

		Consultation Issues				Outcome
Date	Nature of Correspondence	Sandhill Site	Former EOD Site	Hebble Creek Road Site	Skeel Avenue Site	
5/1/2009	NPS Response	No adverse comments	No adverse comments	Opposes, citing direct violation of the 2007 General Mgt Plan which includes relocation of the park visitor's entrance to Gate 18C which takes visitors along Hebble Creek Rd, resulting in reduced visitor access and increased noise; represents a step backwards after removal of the Rod & Gun Club; disagree with assessment that only a small number of visitors visit the	Supported Skeel Avenue Site as the most desirable of the 4 proposed Alternatives	
5/8/2009	WPAFB clarification (e-mail)			Clarified that the CATM area is not the intended location for the EOD range and that no physical access will be closed to the Flying Field during EOD activities		
5/21/2009	NPS Response			Acknowledged receipt of clarifications		
1/26/2009	WPAFB amendment to initial consultation request	Informed NPS that the Skeel Avenue site is the preferred alternative				

10/24/2008

WPAFB Consultation Request



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

24 October 2008

88 ABW/CEV
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

Mr. Lawrence Blake
Superintendent
Dayton Aviation Heritage National Historical Park
P.O. Box 9280
Wright Brothers Station
Dayton OH 45409

Dear Mr. Blake

Wright-Patterson Air Force Base (WPAFB) is preparing an environmental assessment for the proposed construction and operation of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range. In accordance with Title 32, Code of Federal Regulations, Part 989, *Environmental Impact Analysis Process*, and Title 36, Code of Federal Regulations, Part 800, *Protection of Historic Properties*, WPAFB is affording you the opportunity to provide comments and/or become a consulting party with regards to this proposed undertaking. The proposed locations for the EOD range are (see Attachment 1 for maps of the proposed locations):

- I. Former EOD range (Area C of WPAFB)
- II. Property north of Hebble Creek Road and west of the Huffman Prairie Flying Field (Area C of WPAFB)
- III. Sand Hill (north of Area C of WPAFB)

The purpose of the EOD range is to provide Air Force required proficiency training to EOD personnel. Training at the EOD range would occur an average of 3 days/week, up to 8 hours/day. The eight hours involve setting up/training for the detonation of explosive materials (maximum explosive material detonated is five pounds C4 at one time). The actual detonation/explosion takes less than one second. The "clear" zone around the detonation site is a 500-foot radius. The detonations will be performed inside a walled containment barrier, most likely concrete. On an emergency basis only, this site will also be used to detonate unexploded ordnance that comes from the base and also from the public. This project would involve constructing a precast concrete barrier six feet tall, approximately 46 feet long x 24 feet wide, with two open entrances. Two smaller barriers (approximately 6 feet long x 6 feet wide x 4 feet high) to contain tools and explosive materials, and a gravel access road and parking area would also be constructed. The site would be fenced off. See Attachment 2 for examples of the barriers.

11/7/2008

NPS Response



United States Department of the Interior

NATIONAL PARK SERVICE
Dayton Aviation Heritage National Historical Park
P.O. Box 9280 Wright Brothers Station
Dayton, Ohio 45409



IN REPLY
A22(DAAV)

November 7, 2008

Ms. Estella Holmes
ASC/ENVR
1801 10th Street, Suite 2
Wright-Patterson Air Force Base, Ohio 45433-7624

Dear Ms. Holmes:

The National Park Service, Dayton Aviation Heritage National Historical Park is in receipt of your letter of 24 October 2008 concerning the proposed construction and operation of an Explosives Ordnance Disposal Proficiency Training and Emergency Disposal Range (EOD) for the 88 ABW/CED at Wright-Patterson Air Force Base.

The National Park Service strongly opposes proposed location II for the EOD facility. Proposed location II directly conflicts with the Cultural Landscape Report (*From Pasture to Runway: Huffman Prairie Flying Field, Wright Patterson Air Force Base Cultural Landscape Report* (2002)) and the park's General Management Plan Amendment (2007) (GMPA), a document for which the Air Force participated as a cooperating agency during its preparation. Together, these documents detail a program of preservation, rehabilitation, and restoration for the Huffman Prairie Flying Field and increased access for an enhanced visitor experience at this nationally and internationally significant site.

The approved alternative recommended in the GMPA, with which the Air Force concurred, directs the relocation of the principal visitor entry point for Huffman Prairie Flying Field to an upgraded, dedicated gate 18C to increase both the visibility of the site, as well as visitor access. The proposed EOD location at the former Combat Arms Training Maintenance (CATM) facility, which the Air Force proposes to use approximately three times per week (simultaneously barring public visitation to the flying field), would result in reduced visitor access to the flying field, increased noise, and degradation of the cultural landscape, conditions diametrically contrary to the plans of the NPS and the Air Force to increase visitor access to the Wright brothers' airfield and enhancement of the visitor experience.

The proposed EOD location would directly and significantly impact the visitor experience at the flying field. Surveys of visitors to the Huffman Prairie Flying Field during the past five years consistently cite noise and activity from the existing Rod and Gun Club range and the (now removed) CATM facility, two intrusive site elements recommended for removal in *From Pasture to Runway: Huffman Prairie Flying Field, Wright Patterson Air Force Base Cultural Landscape Report* (2002). Comments from visitors obtained through the annual surveys include the following:

- A "rifle range next to the site was in use, very disappointing. With all the land available for a rifle range, it makes no sense to locate one [beside the Flying Field]."
- "The Huffman Prairie site should not be closed 2 days a week. The Air Force should move the shoot [sic] range."
- The "shooting range near Huffman Field takes away from the site."



WPAFB Transmittal of EA to NPS

5/1/2009

NPS Response



United States Department of the Interior

NATIONAL PARK SERVICE
Dayton Aviation Heritage National Historical Park
P.O. Box 9280 Wright Brothers Station
Dayton, Ohio 45409

May 1, 2009



IN REPLY

Mr. Raymond F. Baker
Chief, Quality Branch
88 ABW/CEVY
1450 Littrell Road.
Wright-Patt Air Force Base, OH 45433

Dear Mr. Baker:

Dayton Aviation Heritage National Historical Park appreciates the recent offer from the U.S. Air Force to comment upon the draft Environmental Assessment for the proposed construction and operation of an explosives ordnance disposal proficiency training and emergency disposal range (EOD) for the 88 ABW/CED.

In reviewing the four proposed locations for the EOD range, the National Park Service opposes the Hebble Creek Road site, which is in direct violation of the park's 2007 amended General Management Plan (GMPA), a document for which the Air Force served as a cooperating agency. The GMPA directs the relocation of the principal visitor entry for Huffman Prairie Flying Field to an upgraded, dedicated gate 18C, with travelers reaching the Flying Field by Marl and Hebble Creek roads, replacing the current, circuitous access through gate 16A, which also serves as the commercial vehicle gate for Area A. The proposed EOD location at the former Combat Arms Training Maintenance (CATM) facility, which the Air Force proposes to use approximately three times per week (simultaneously barring public visitation to the Flying Field), would result in reduced visitor access to the Flying Field and increased noise, conditions diametrically contrary to the plans of the NPS and the Air Force to increase visitor access to the Wright brothers' airfield.

The proposed EOD location also directly impacts visitor experiences at the flying field. Surveys of visitors to the Huffman Prairie Flying Field during the past five years, consistently cite noise and activity from the existing Rod and Gun Club range and the (now removed) CATM facility, two intrusive site elements recommended for removal in *From Pasture to Runway: Huffman Prairie Flying Field, Wright Patterson Air Force Base Cultural Landscape Report* (2002).



NATIONAL AVIATION
HERITAGE AREA

Without the Huffman Prairie Flying Field being staffed daily, the only visitor statistics kept by the National Park Service are those for the guided tours or educational programs. In 2008 over 18,000 people visited the Huffman Prairie Flying Field Interpretive Center, and we believe a large portion of these individuals also visit the flying field. Thus, we do not agree with your conclusions that visitor impact would be minimal due to the majority of visits occurring on the weekend.

Due to the moderate probability of visitors hearing explosions from an EOD range at the Hebble Creek Road site, and the National Park Service does not have visitor statistics for every day the Huffman Prairie Flying Field is open, hence our belief that more visits occur at the flying field, we do not concur with your finding of no adverse impact for this proposed site.

In reviewing the four alternative sites for the location of the EOD range, the National Park Service finds that the newly added site along Skeel Road would have less impact on Huffman Prairie Flying Field, its operation and visitor experience than the Hebble Creek Road site. For this reason, we support the preferred alternative of Wright-Patterson Air Force Base for the Skeel Road location.

If you have any questions about these comments, please contact me or Ann Honious, Chief of Education and Resource Management at 740-225-7705.

Sincerely Yours,

A handwritten signature in black ink, appearing to read "Dean Alexander", with a long, sweeping horizontal line extending to the right.

Dean Alexander
Superintendent



United States Department of the Interior

National Park Service

Midwest Region
601 Riverfront Drive
Omaha Nebraska 68102-4226



26 NOV 2008

D18(MWR-PCL/PC)

Colonel Bradley Spacy
Commander, 88th Air Base Wing
5135 Pearson Road, Room 218
Wright-Patterson Air Force Base, Ohio 45433-5320

Dear Colonel Spacy:

The National Park Service (NPS), Dayton Aviation Heritage National Historical Park (Park), received your letter of October 24, 2008. That letter indicates Wright-Patterson Air Force Base (WPAFB) is preparing an environmental assessment for a proposal to locate an Explosives Ordnance Disposal proficiency training and emergency disposal range on the base. Location II is in an area once occupied by the former Combat Arms Training Maintenance facility immediately adjacent to the Huffman Prairie Flying Field (Field), a unit of the Park. The Park Superintendent recently sent a letter to you concerning issues that we have with location II. One issue is that a new facility such as you propose may be incompatible with the recently completed General Management Plan Amendment (GMPA) for which the Air Force participated as a Cooperating Agency. We are specifically concerned that this proposal, if implemented, has the potential to directly affect visitor access and experiences at the Field. These were two specific areas of concern addressed by the GMPA, and for which the NPS received considerable support from WPAFB. In addition, we are concerned that the improvements we have made in visitor access and experiences since the GMPA would be severely affected by this proposal.

The Superintendent has agreed to be a consulting party, pursuant to 36 CFR Part 800, for the purposes of the National Historic Preservation Act. In addition, the Superintendent requested to be granted Cooperating Agency status pursuant to the National Environmental Policy Act (NEPA). While often reserved for environmental impact statements, the CEQ Memorandum of January 30, 2002, recognizes situations where Cooperating Agency status may extend to environmental assessments, especially in areas where there is need for integration of various environmental laws. Our concern in this regard extends to the potential of this alternative to affect the Field, a National Historic Landmark (Landmark). The NPS, Midwest Regional Office, has been delegated the responsibility for Landmarks within our region and our representative would also be willing to participate and assist in the consultation for this project along with the staff of the Park.

The NPS has a continuing interest in working with WPAFB to ensure that impacts to resources of concern to the NPS are adequately addressed. The overall contact for this consultation will



5/8/2009

WPAFB Clarification (E-mail)

Terri Zick

From: Terri Zick
Subject: RE: EOD Letter

-----Original Message-----

From: Ann_Honious@nps.gov [mailto:Ann_Honious@nps.gov]
Sent: Thursday, May 21, 2009 12:01 PM
To: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY
Cc: dean_alexander@nps.gov; Ferguson, Janet E Civ USAF AFMC 88 ABW/CEVO; Justin Cook; Mays, Mark L YF-03 USAF AFMC 88 ABW/CEV; nicholas_georgeff@nps.gov
Subject: Re: EOD Letter

Raymond:

Thank you for this clarification on the proposed site nearest HPFF for the
EOD range.

Best,

Ann

Ann Honious, Chief, Education and Resources Management
Dayton Aviation Heritage National Historical Park
P.O. Box 9280, Dayton, OH 45409

937.225.7705 voice
937.225.7706 fax

The National Park Service cares for special places saved by the American people so that all
may experience our heritage.

"Baker, Raymond USAF AFMC 88 ABW/CEVY"

From: <Raymond.Baker@wp

To: <dean_alexander@nps.gov>afb.af.mil
<nicholas_georgeff@nps.gov>,

05/08/2009 11:51

"Justin Cook"<jcook@ohiohistory.org>,"Ferguson,Janet E Civ USAF AFMC 88 ABW/CEVO"

Raymond F. Baker

Chief, Quality Branch

88 ABW/CEVY

1450 Littrell Road

WPAFB OH 45433

Comm: (937) 257-0177

DSN: 787-0177

Cell: (937) 673-4878

-----Original Message-----

From: Ann_Honious@nps.gov [mailto:Ann_Honious@nps.gov]

Sent: Friday, May 01, 2009 4:01 PM

To: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY

Cc: Dean Alexander@nps.gov; Nicholas Georgeff@nps.gov; Edward Roach@nps.gov

ov

Subject: EOD Letter

Raymond:

Attached is a file of our letter responding to the EOD alternatives. A hard copy was sent regular mail today.

Best,

Ann

Ann Honious, Chief, Education and Resources Management
Dayton Aviation Heritage National Historical Park P.O. Box 9280,

5/21/2009

NPS Response

Terri Zick

>: Terri Zick
Subject: RE: EOD Letter

-----Original Message-----

From: Ann_Honious@nps.gov [mailto:Ann_Honious@nps.gov]
Sent: Thursday, May 21, 2009 12:01 PM
To: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY
Cc: dean_alexander@nps.gov; Ferguson, Janet E Civ USAF AFMC 88 ABW/CEVO; Justin Cook; Mays, Mark L YF-03 USAF AFMC 88 ABW/CEV; nicholas_georgeff@nps.gov
Subject: Re: EOD Letter

Raymond:

Thank you for this clarification on the proposed site nearest HPFF for the EOD range.

Best,

Ann

Ann Honious, Chief, Education and Resources Management
Dayton Aviation Heritage National Historical Park
P.O. Box 9280, Dayton, OH 45409

937.225.7705 voice
937.225.7706 fax

The National Park Service cares for special places saved by the American people so that all may experience our heritage.

"Baker, Raymond USAF AFMC 88 ABW/CEVY"

From: <Raymond.Baker@wp

To: <dean_alexander@nps.gov>afb.af.mil
<nicholas_georgeff@nps.gov>,

05/08/2009 11:51

"Justin Cook"<jcook@ohiohistory.org>,"Ferguson,Janet E Civ USAF AFMC 88 ABW/CEVO"

10/26/2009

WPAFB Amendment to Initial Consultation Request



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

26 October 2009

88 ABW/CEV
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

Mr. Ernest Quintana
Regional Director
Midwest Region, National Park Service
601 Riverfront Drive
Omaha NE 68102-4226

Dear Mr. Quintana

My apologies for not responding sooner to your 26 November 2008 letter regarding our environmental assessment for locating a proposed Explosive Ordnance Disposal (EOD) proficiency training range on Wright-Patterson Air Force Base (WPAFB). Your letter raised issues about the potential impacts to Huffman Prairie Flying Field should WPAFB select the site of the former Combat Arms Training and Maintenance Facility (now referred to as the Hebble Creek Road site) as the site for the EOD range. You pointed out that these issues, primarily relating to visitor access and the visitor experience at Huffman Prairie Flying Field, were a central feature of the recently completed General Management Plan Amendment (GMPA) for Dayton Aviation Heritage National Historical Park, for which WPAFB was a cooperating agency. Your concern is that siting the proposed EOD range at the Hebble Creek Road site, adjacent to Huffman Prairie Flying Field, is incompatible with the GMPA and would severely affect visitors.

I want to assure you that we have taken these issues and concerns seriously. Let me also state that we clearly recognize the status and importance of Huffman Prairie Flying Field as a National Historic Landmark. Since receiving your letter and that from former Superintendent Lawrence Blake, Dayton Aviation Heritage National Historical Park, we have worked to find additional suitable alternatives for siting the proposed EOD range. Because of the technical nature of the EOD requirements, we have chosen to work this process internally to WPAFB. We selected a new site as our preferred alternative for siting the EOD range as we went through the environmental analysis process, because the initially preferred alternative turned out not to be feasible. This new site, known as the Skeel Avenue site, is near the hazardous cargo pads on the northeast side of our state natural landmark, Huffman Prairie, farther away from Huffman Prairie Flying Field. The Skeel Avenue site location is depicted on Attachment 1.

We sent a revised version of the environmental assessment to your National Historic Landmarks staff, with the new Skeel Avenue preferred alternative site incorporated. We would appreciate receiving any comments you and your staff may have by 9 Nov 09. This assessment was prepared in response to comments from the National Park Service and other agencies. We

12/7/2009

NPS Response



United States Department of the Interior

National Park Service

Midwest Region
601 Riverfront Drive
Omaha, Nebraska 68102-4226



H34 (MWR-CR/HNRP)
D18(MWR-PCL/PC)

Mr. Mark Mays
Chief, Environmental Management Division
88 ABW/CEVO
1450 Littrell Road
Wright-Patterson Air Force Base, Ohio 45433-5209

MM
7 Dec 09

Dear Mr. Mays:

In accordance with Section 106 of the National Historic Preservation Act, as amended, and the Advisory Council on Historic Preservation's regulation set forth in 36CFR800.10, the National Park Service has reviewed the revised draft Environmental Assessment (EA) for the Explosives Ordinance Disposal Environmental Proficiency Training and Emergency Disposal Range (EOD) at Wright-Patterson Air Force Base (WPAFB). We appreciate that you have acknowledged our previous concerns regarding the proposed location of the EOD at the Hebble Creek Road site and the likely visual and auditory intrusions on the Huffman Prairie Flying Field National Historic Landmark (NHL). After a reassessment of suitable alternatives, the revised draft EA currently states the preferred location of the EOD is the Skeel Avenue Site.

As described in the EA, the proposed action to locate the EOD at the Skeel Avenue Site results in a relatively small (6 acres) portion of the NHL falling within the 3000-foot radius where a 129 decibel (dB) noise contour will be heard. The letter from the Ohio Historic Preservation Office (dated June 22, 2009) states that noise at this level "will significantly compromise the most important aspects of its (the NHL) historic integrity—its setting and feeling." While we agree that the noise generated by the EOD tests (as described, 8 detonations during each "training event" over an 8-hour day, approximately 3 days per week) will present an adverse effect, we feel that the effect would be indirect. It is our opinion that the noise impacts on the overall NHL from the EOD operations will not present any appreciable escalation in noise that has not previously been experienced on a daily basis at the base.

With regard to potential negative visual impacts as a result of the EOD at the Skeel Avenue site, it is our opinion that construction of a 6-foot high concrete structure in an area that currently includes development linked to military operations would not appreciably constitute additional impacts on the viewshed. We encourage consideration of employing a neutral color such as gray so the EOD structure would effectively blend in with the current structures present.



11/26/2008

NPS (Midwest Region) Response



United States Department of the Interior

National Park Service

Midwest Region
601 Riverfront Drive
Omaha Nebraska 68102-4226



26 NOV 2008
D18(MWR-PCL/PC)

Colonel Bradley Spacy
Commander, 88th Air Base Wing
5135 Pearson Road, Room 218
Wright-Patterson Air Force Base, Ohio 45433-5320

Dear Colonel Spacy:

The National Park Service (NPS), Dayton Aviation Heritage National Historical Park (Park), received your letter of October 24, 2008. That letter indicates Wright-Patterson Air Force Base (WPAFB) is preparing an environmental assessment for a proposal to locate an Explosives Ordnance Disposal proficiency training and emergency disposal range on the base. Location II is in an area once occupied by the former Combat Arms Training Maintenance facility immediately adjacent to the Huffman Prairie Flying Field (Field), a unit of the Park. The Park Superintendent recently sent a letter to you concerning issues that we have with location II. One issue is that a new facility such as you propose may be incompatible with the recently completed General Management Plan Amendment (GMPA) for which the Air Force participated as a Cooperating Agency. We are specifically concerned that this proposal, if implemented, has the potential to directly affect visitor access and experiences at the Field. These were two specific areas of concern addressed by the GMPA, and for which the NPS received considerable support from WPAFB. In addition, we are concerned that the improvements we have made in visitor access and experiences since the GMPA would be severely affected by this proposal.

The Superintendent has agreed to be a consulting party, pursuant to 36 CFR Part 800, for the purposes of the National Historic Preservation Act. In addition, the Superintendent requested to be granted Cooperating Agency status pursuant to the National Environmental Policy Act (NEPA). While often reserved for environmental impact statements, the CEQ Memorandum of January 30, 2002, recognizes situations where Cooperating Agency status may extend to environmental assessments, especially in areas where there is need for integration of various environmental laws. Our concern in this regard extends to the potential of this alternative to affect the Field, a National Historic Landmark (Landmark). The NPS, Midwest Regional Office, has been delegated the responsibility for Landmarks within our region and our representative would also be willing to participate and assist in the consultation for this project along with the staff of the Park.

The NPS has a continuing interest in working with WPAFB to ensure that impacts to resources of concern to the NPS are adequately addressed. The overall contact for this consultation will



10/5/2009

WPAFB Transmittal of EA to NPS Midwest Regional Office



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

5 October 2009

88 ABW/CEVO
1450 Pearson Road
Wright-Patterson AFB OH 45433-5209

Mr. Geoffrey Burt
National Park Service, Midwest Regional Office
National Register Programs
601 Riverfront Office
Omaha NE 68102

Dear Mr. Burt

Attached per your request is a CD of the draft environmental assessment (EA) for our proposed Explosives Ordnance Disposal (EOD) Training and Emergency Disposal Range, to be located on Wright-Patterson Air Force Base (Attachment 1). Please review the EA and let me know your views on the potential impacts of the preferred alternative to Huffman Prairie Flying Field, a National Historic Landmark.

As you know, we are anxious to finalize our EA so that we may move forward to site selection and project implementation. The EOD range is a mission-critical project for the base. Should you have questions, I can be reached at janet.ferguson@wpafb.af.mil or at (937) 257-5528.

Sincerely

A handwritten signature in blue ink that reads "Jan Ferguson".

JAN FERGUSON
Chief, Operations Branch
Environmental Management Division

1.



Ohio Historic Preservation Office

		Consultation Issues				
Date	Nature of Correspondence	Sandhill Site	Former EOD Site	Hebble Creek Road Site	Skeel Avenue Site	Outcome
10/24/2008	WPAFB Request for Consultation	Formal request for consultation on Alternatives 1 - 3			Not included in request	
1/20/2009	SHPO Response	Strongly encouraged selection of either Alternative 1 or 2	Strongly encouraged consideration of the other alternative sites over the Hebble Creek Road Site; Requested additional information on determination of APE		Declined to concur with finding of no significant impact; unclear how Area of Potential Effects was delineated (particularly limits of noise impacts)	Part 106 consultation incomplete
4/3/2009	WPAFB Clarification	Clarification on the Areas of Potential Effect (APE) and addition of Skeel Ave Alternative to consultation request				
6/22/2009	SHPO Response	No Historic properties will be adversely affected	No Historic properties will be adversely affected	Significant adverse impacts to National Historic Landmark site	Adverse effects to portions of the Huffman Prairie and the Brick Quarters Historic District	Part 106 consultation complete for Former EOD and Sandhill Alternatives
3/29/2010	MOA	N/A	N/A	N/A	Memorandum of Agreement signed between WPAFB, SHPO and NPS	Executed MOA; Part 106 consultation complete

Addition of Skeel Avenue to consultation request

10/24/2008

WPAFB Request for Consultation



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

24 October 2008

88 ABW/CEVO
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

Mr. Mark Epstein
Department Head, Resource Protection & Review
Ohio Historic Preservation Office
567 East Hudson Street
Columbus OH 43211-1030

Dear Mr. Epstein

Wright-Patterson Air Force Base (WPAFB) is preparing an environmental assessment for the proposed construction and operation of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range. The proposed locations for the EOD range are:

- I. Former EOD range (Area C of WPAFB)
- II. Property north of Hebble Creek Road and west of the Huffman Prairie Flying Field (Area C of WPAFB)
- III. Sandhill (north of Area C of WPAFB)

Only one location will be selected for siting of the EOD range. See Attachment 1 for maps and photographs of the proposed locations and areas of potential effects (APE). In our opinion, construction and operation of the EOD range at any of the three proposed locations will have no adverse effect on historic properties. In accordance with 36 CFR 800.11(e), we are submitting the following documentation.

Description of the Undertaking. The purpose of the EOD range is to provide Air Force required proficiency training to EOD personnel. This is a mission essential requirement. Training at the EOD range would occur an average of 3 days/week, up to 8 hours/day. The eight hours involve setting up/training for the detonation of explosive materials (maximum explosive material detonated is five pounds C4 at one time). The maximum number of detonations that would occur in a training day is one per hour or a total of eight. The actual detonation/explosion takes less than one second. The clear zone around the detonation site is a 500-foot radius and requires a 300-foot radius of non-combustible materials, i.e. mowed vegetation. The clear zone must also be absent of any buildings, structures, above-ground utilities, and any standing vegetation, such as trees and shrubs. The detonations will be performed inside a walled containment barrier, most likely concrete. On an emergency basis only, this site will also be used to detonate unexploded ordnance that comes from the base and also from the public. This project would involve constructing a precast concrete barrier six feet tall, approximately 46 feet long x 24 feet wide, with two open entrances. Two smaller barriers (approximately 6 feet long x 6 feet wide x 4 feet high) to contain tools and explosive materials, a flagpole, and a gravel access road and parking area would also be constructed. The site would be secured with a fence around the clear zone. See Attachment 2 for examples of the barriers.

Description of Steps Taken to Identify Historic Properties. WPAFB has assessed all buildings on the installation that are 50 years or older, and has assessed buildings for exceptional significance relating to the Cold War. Your office has reviewed the information we have collected, and our two offices have

reached a consensus determination of eligibility for listing in the NRHP for facilities at WPAFB. At this time, buildings that have just reached or will reach 50 years of age are being assessed, and the current historic significance of previously surveyed buildings is being re-assessed. We have also undertaken archaeological surveys for prehistoric and historic-era archaeological sites, and have provided reports of those surveys for your office for review.

Former EOD range. This site is approximately 5 acres in size and is located in Area C north of the intersection of Riverview and Symmes Road. This site was the previous location of the EOD range which operated for over 40 years and was closed in 1990. It is located approximately 400 feet east of the Mad River. There are no known historic properties located within or adjacent to the APE.

Property north of Hebble Creek Road and west of the Huffman Prairie Flying Field. The proposed EOD range at this location is north of Hebble Creek Road and approximately 900 feet west of the western boundary of the Huffman Prairie Flying Field (HPFF), a National Historic Landmark. HPFF is also a unit of the Dayton Aviation Heritage National Historical Park, which is operated by the National Park Service (NPS). Besides the HPFF, there are no other known historic properties located within or adjacent to the APE.

Sandhill. The proposed EOD range at this location is northeast of State Route 235 (Chambersburg Road) and east of Haddix Road. There are no known historic properties located within or adjacent to the APE.

Description of the Undertaking's Effects on Historic Properties. The only proposed location that has the potential to impact historic properties is the area west of the HPFF. The following factors and potential impacts are being assessed for siting of the range at all three proposed locations:

- Impacts to airfield operations
- Impacts to noise and safety
- Impacts to surrounding residential neighborhood
- Impacts to historic characteristics of HPFF
- Impacts to public visiting Dayton Aviation Heritage National Historical Park
- Impacts to threatened and endangered species and their habitat
- Impacts to floodplain
- Impacts to EOD operations due to being located in the floodplain
- Transportation of explosive materials on public vs. base roadways

Property north of Hebble Creek Road and west of the Huffman Prairie Flying Field. Should this site be selected for the location of the EOD range, the intent is to minimize the visual impact when viewed from the HPFF. This will be accomplished by installing a fence that is similar to the existing wire farm fence outlining the boundary of the HPFF. Also, due to the relatively short height and the type of construction materials (wood or concrete) of the three barriers, there will be minimal visual impact to the flying field. It is our opinion that the more significant potential impact from the EOD range to the HPFF is its noise impact to the national park visitors resulting from the munitions' detonations. As was noted above, the maximum number of detonations in one training day would be one per hour, or a total of eight per day. The following operational controls are mitigative measures that could be implemented to generate awareness and help alleviate the impact to the park visitor:

- The HPFF is closed every Wednesday to allow full use of the shotgun skeet range, which is located approximately 500 feet southeast of the southeastern boundary of the flying field. One of the three EOD range training days could be conducted on Wednesdays which would eliminate the impact to the park visitor.
- A flag will be flown and signs posted at the EOD range identifying EOD operations are occurring.
- Notifications prior to EOD operations would be made to identified base agencies and the NPS.

The proposed EOD range would be approximately 800 feet northwest of where the former Combat Arms Training and Maintenance (CATM) range was located. The former CATM was in operation up until 2004. The CATM was a semi-enclosed baffled indoor range where small arms, including M-16s, were fired and could be heard at the HPFF. The shotgun skeet range is in operation Mondays and Tuesdays 1100 to 1300 hours, Wednesdays 1100 to 2000 hours, and Saturdays and Sundays 0800 to 1800 hours.

It should be noted that the former CATM site will be the location of the storage building for the replica civilian 1911 Wright B Flyer, in which we received OHPO concurrence on 26 Jun 07 for siting of the storage facility. Construction of the storage facility began this month and is expected to be completed in the Spring of 2009.

Finding of No Adverse Effect. It is our opinion that if the EOD range was sited at the area west of the HPFF that no physical adverse impacts would occur on the HPFF. Audible impacts from the detonations would be experienced by visitors to the HPFF; however they would be mitigated by the above operational controls. In accordance with 36 CFR 800.5(b), the proposed action will have no adverse effect on the Huffman Prairie Flying Field or any other historic properties.

On 24 Oct 08, correspondence was sent to the NPS and National Aviation Heritage Alliance, inviting these agencies to provide written comments and participate as consulting parties in the Section 106 process. Please review the documentation we have provided and let us know whether you concur with the no adverse effect determination. Should you have any questions, please contact Mr. Raymond Baker at (937) 257-0177, or via e-mail at raymond.baker@wpafb.af.mil.

Sincerely

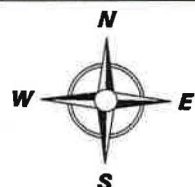
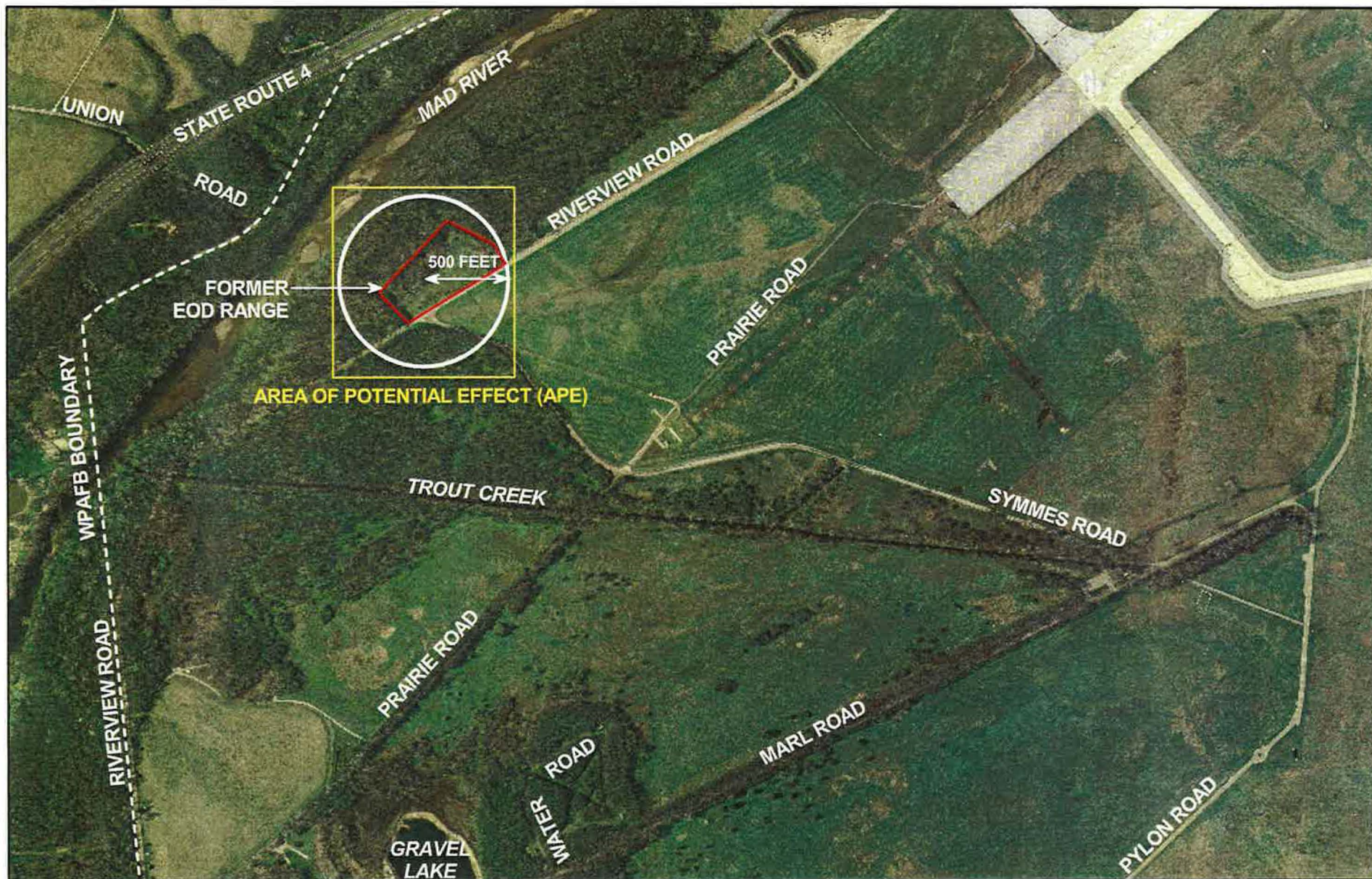


JAN FERGUSON
Chief, Operations Branch
Environmental Management Division

Attachments

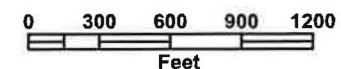
1. Site Maps and Photographs
2. EOD Barrier Examples

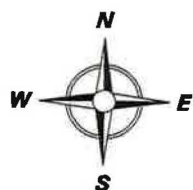
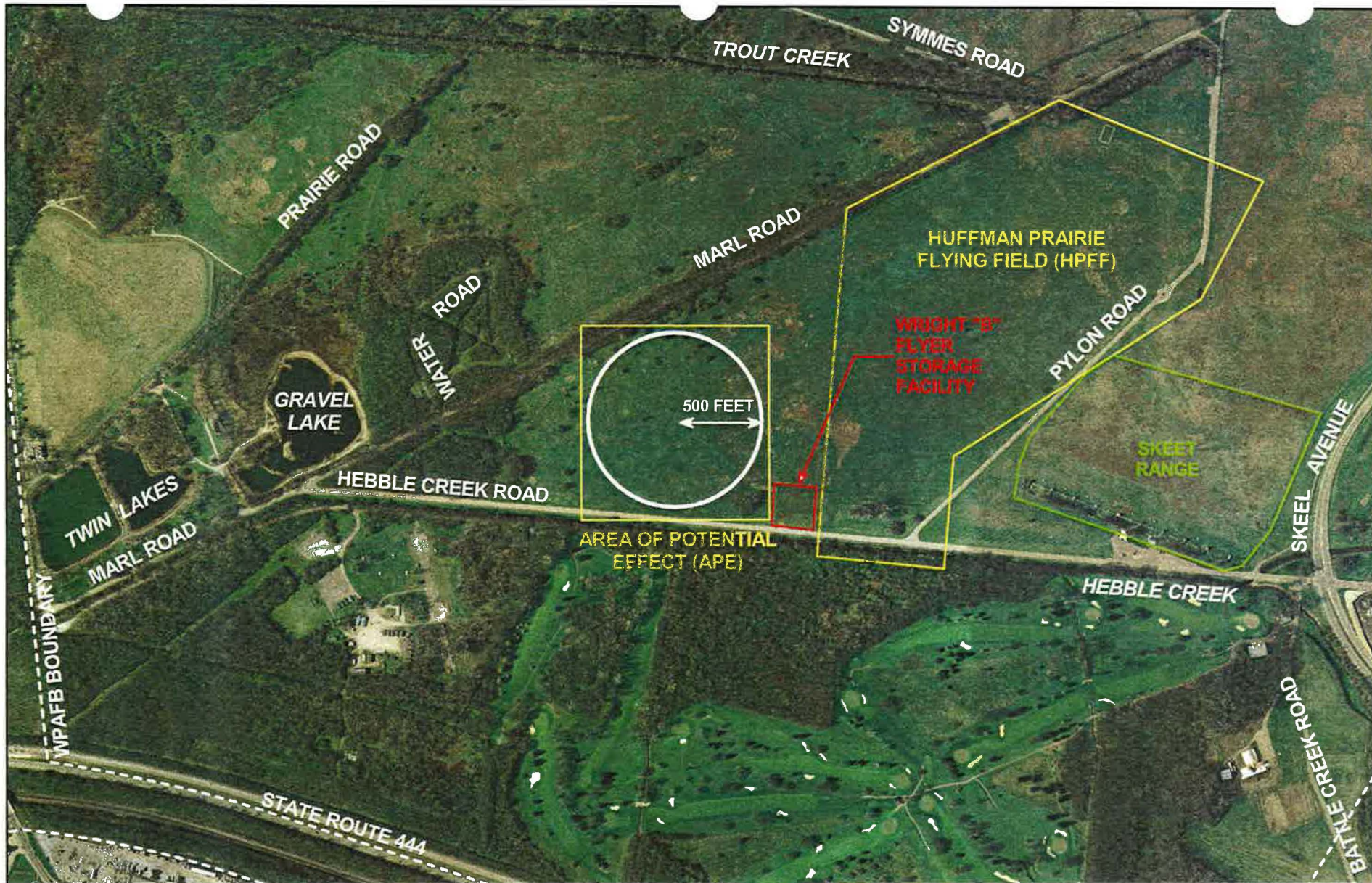
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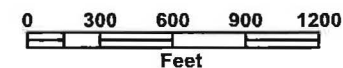
WRIGHT-PATTERSON AIR FORCE BASE, OH
88 ABW/CEV
ENVIRONMENTAL MANAGEMENT
FORMER EOD RANGE AREA OF POTENTIAL EFFECT (APE)
WITH 500 FOOT AREA

~~FOR OFFICIAL USE ONLY~~





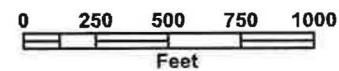
WRIGHT-PATTERSON AIR FORCE BASE, OH
 88 ABW/CEV
 ENVIRONMENTAL MANAGEMENT
 WEST OF HPFF AREA OF POTENTIAL EFFECT (APE)
 WITH 500 FOOT AREA



~~FOR OFFICIAL USE ONLY~~

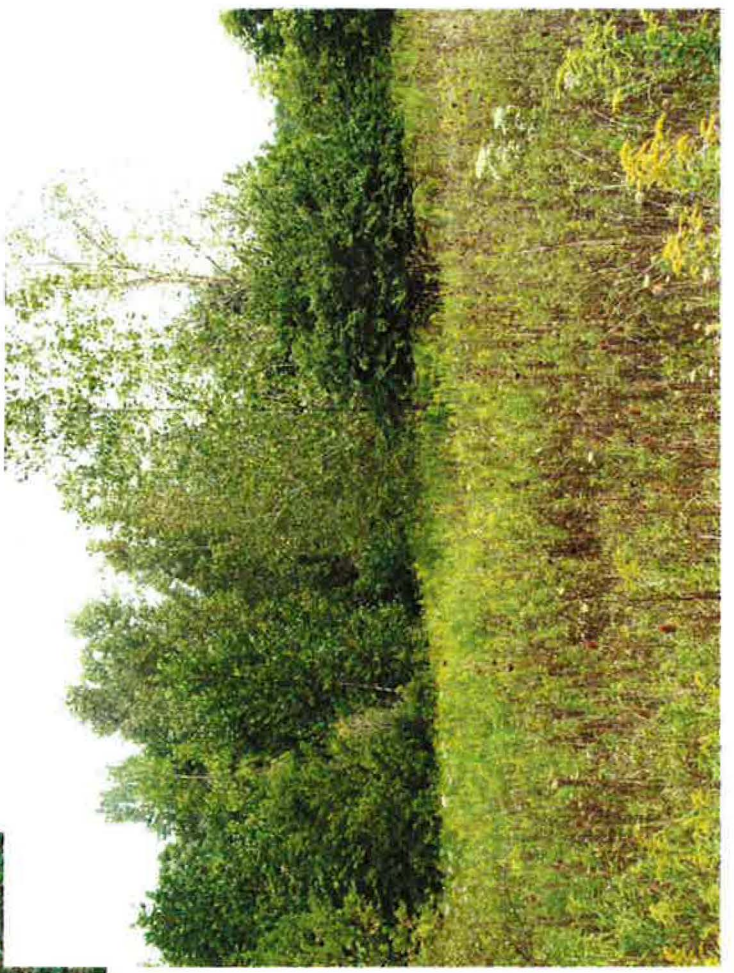


WRIGHT-PATTERSON AIR FORCE BASE, OH
88 ABW/CEV
ENVIRONMENTAL MANAGEMENT
SANDHILL AREA OF POTENTIAL EFFECT (APE)
WITH 500 FOOT AREA



~~FOR OFFICIAL USE ONLY~~

**Proposed Location I.
Former EOD Range**





Proposed Location II. Center of detonation point, looking NW towards HPFF



Proposed Location II. View from HPFF looking SW towards proposed location of EOD range

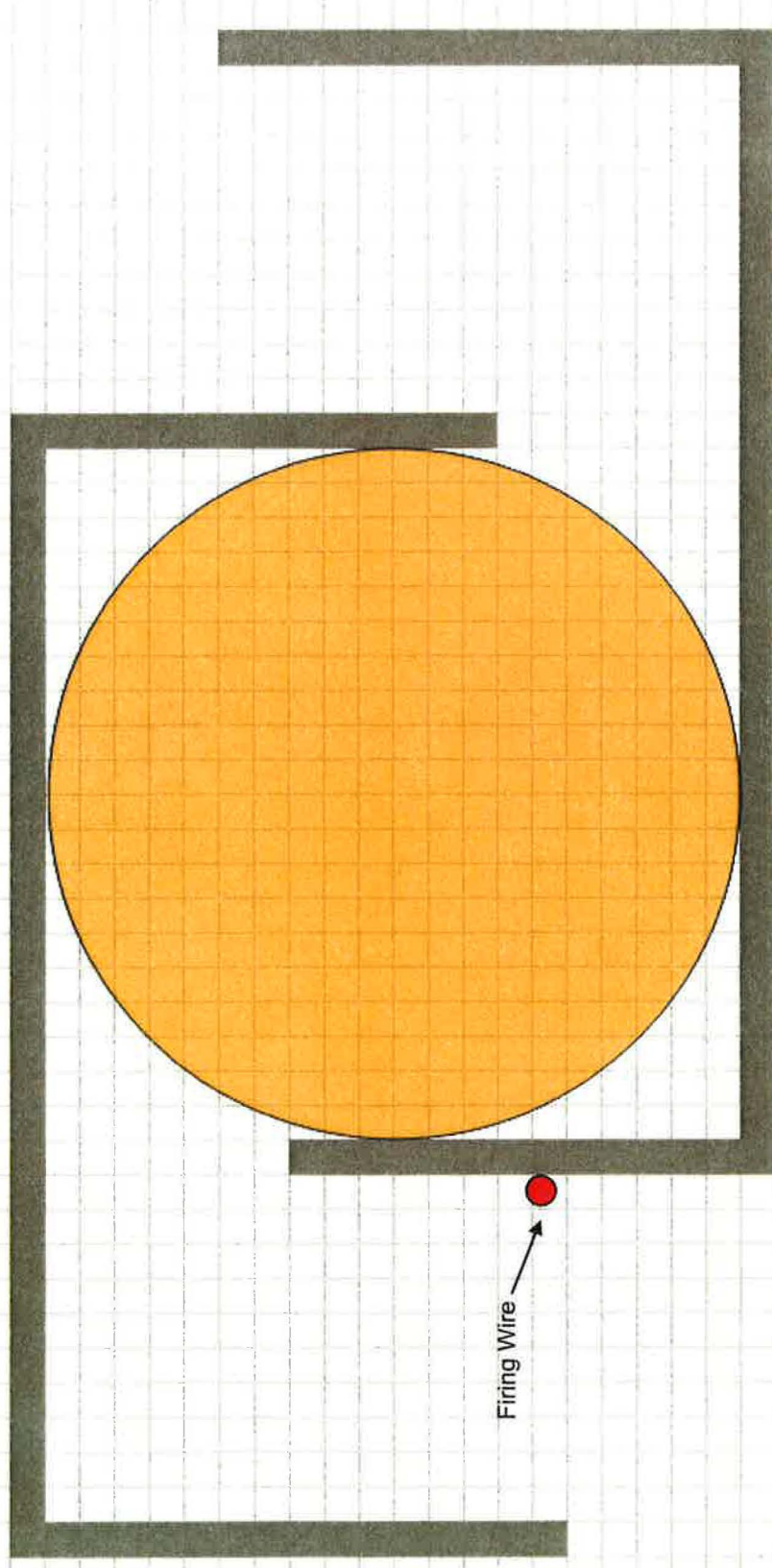


Proposed Location III. Sandhill

Suggested Option

-Area will need to be no less than 46'x 24'

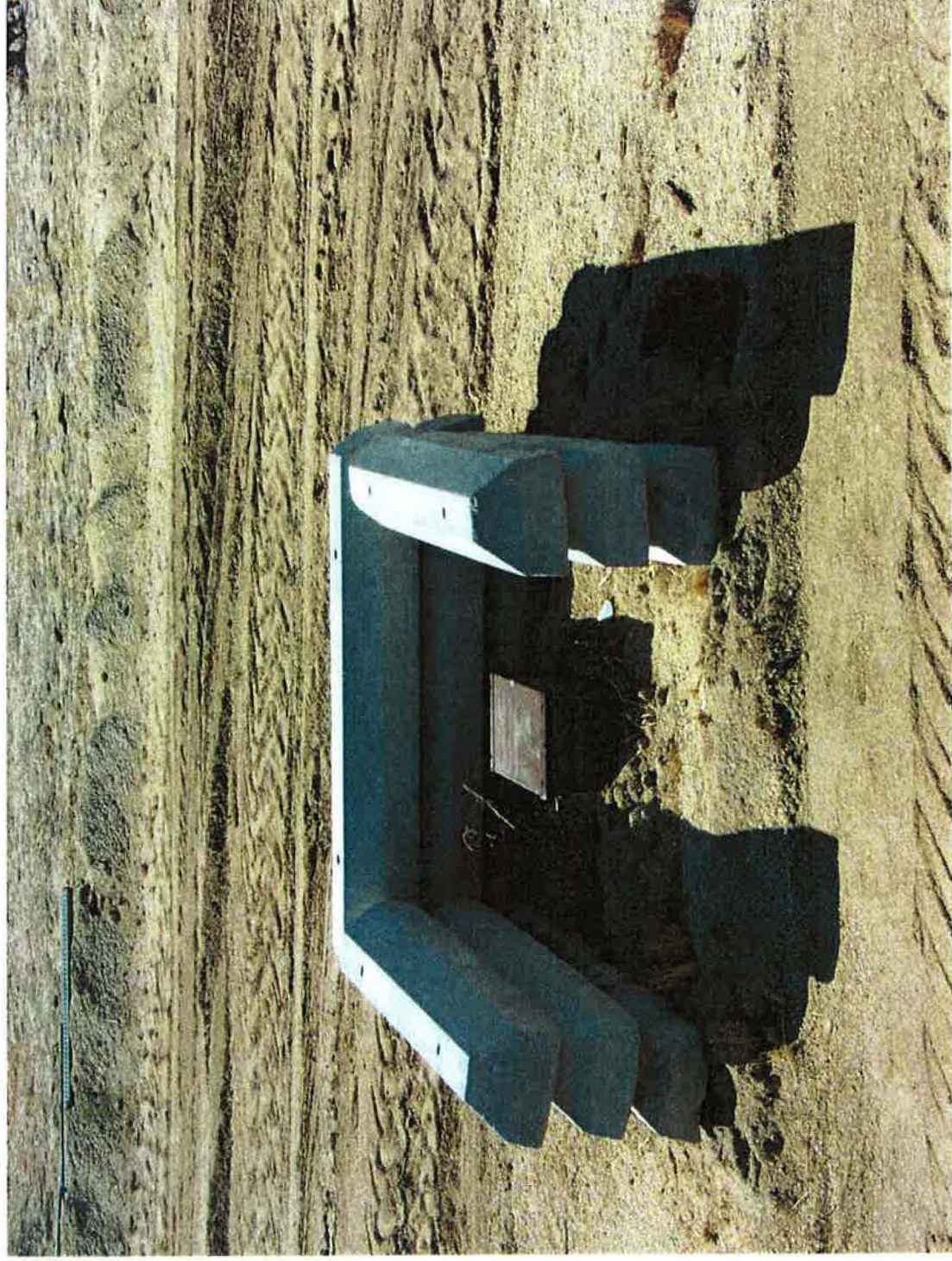
-20' diameter circle



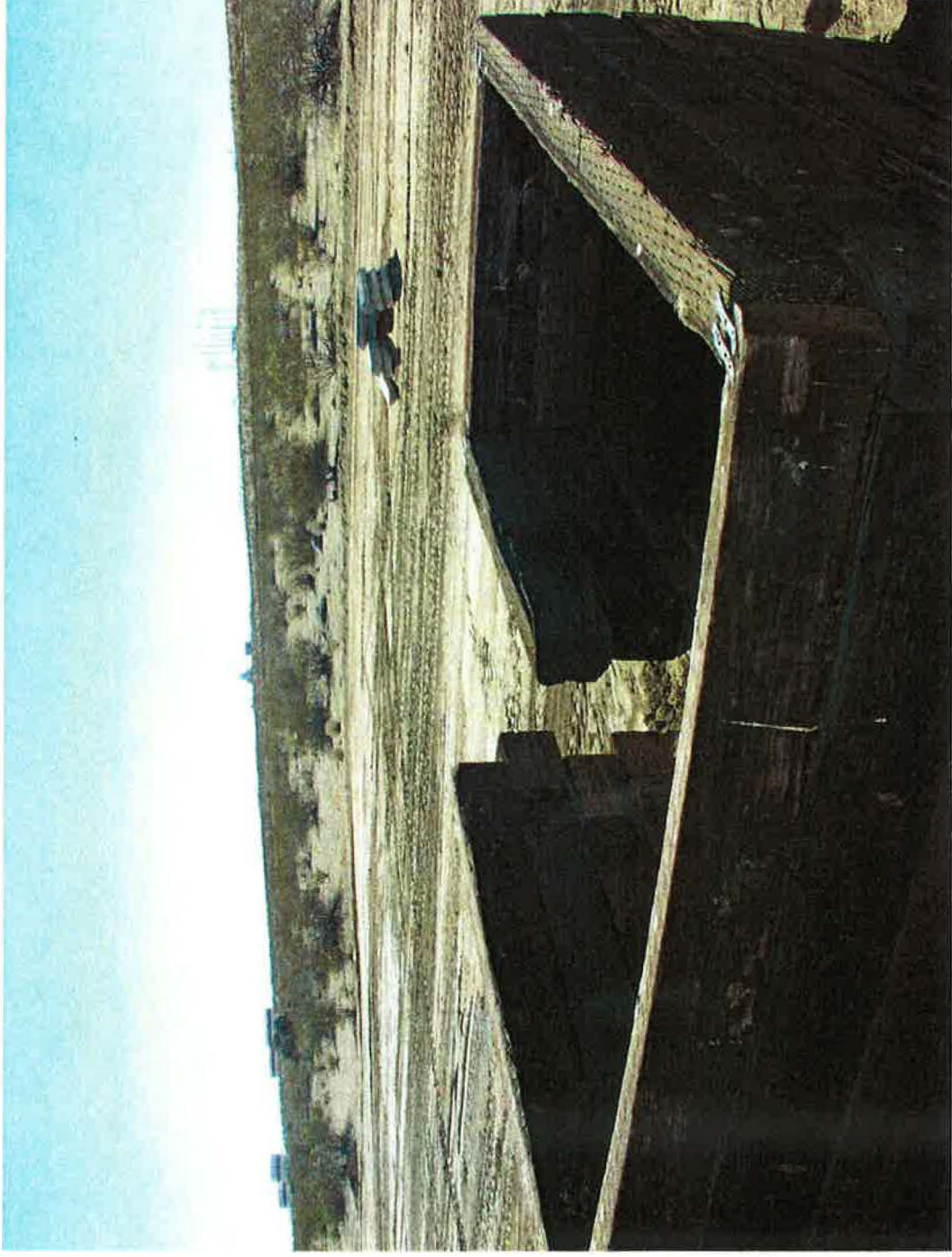
Example of Barrier



Holding Area



Tool Check Out Bunker



1/20/2009

SHPO Response



January 20, 2009

Jan Ferguson
Chief, Operations Branch
Environmental Management Division
88 EBW/CEVO
1450 Littrell Road
Wright-Patterson Air Force Base, Ohio 45433-5209

Dear Ms. Ferguson:

Re: Construction and operation of the 88 ABW/CED Explosives Ordinance Disposal
proficiency training and emergency disposal range at Wright-Patterson Air Force Base

This is in response to correspondence dated October 24, 2008 (received on October 27, 2008) regarding the construction and operation of an Explosives Ordinance Disposal (EOD) range at Wright-Patterson Air Force Base (WPAFB). Our comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and the associated regulations at 36 CFR Part 800.

WPAFB proposes to construct an EOD range and operate the facility an average of three days per week for up to eight hours per day. Construction and operation of the facility is a mission essential requirement. Construction activities will include building a pre-cast, concrete containment barrier approximately 6' tall x 46' long x 24' wide with two open entrances in which detonation of explosive materials will occur. Two smaller barriers (approximately 4' tall x 6' long x 6' wide) will be built to hold tools and explosive materials and a flagpole, gravel access road, and parking area will also be constructed.

The maximum explosive material that will be detonated at the facility at one time is five pounds of C4. The maximum number of detonations that may occur is one per hour, or a total of eight per day. Detonation activities require a clear zone with a 500' radius around the site and 300' radius of non-combustible materials (i.e. mowed vegetation). The clear zone cannot contain any building, structures, above-ground utilities, or standing vegetation.

WPAFB has identified three potential sites for the EOD range. All of the potential sites are located within Area C. The first is the location of the former EOD range, an approximately 5-acre site north of the intersection of Riverview and Symmes Road. The second is north of Hebble Creek Road and approximately 900' west of Huffman Prairie Flying Field. The third (referred to as Sandhill) is northeast of State Route 235 and east of Haddix Road.

WPAFB has evaluated the significance of properties at all three possible sites, evaluated the effects of the project on them, and determined that the project will have no adverse effect on historic properties. Your October 24, 2008 letter requests our concurrence with this finding.

OHIO HISTORICAL SOCIETY

Ohio Historic Preservation Office

567 East Hudson Street, Columbus, Ohio 43211-1030 ph: 614.298.2000 fax: 614.298.2037

www.ohiohistory.org

Jan Ferguson
January 20, 2009

Page Two

We are unable to concur with your no adverse effect finding at this time. We do not understand how WPAFB delineated the Areas of Potential Effects (APE) for this project. While the 500' clear zone around the detonation site seems to be a suitable basis for consideration of direct effects resulting from the project, the Areas of Potential Effects shown in the mapping included in your submission do not appear to account for indirect effects. Your letter acknowledges that "the more significant potential impact from the EOD range...is its noise impact...resulting from the munitions detonations," yet no account is given as to how WPAFB determined the geographic limits of this noise impact.

Until we understand the basis of the Areas of Potential Effects established by WPAFB, we cannot formally comment on your efforts to identify historic properties within these areas and to assess the effects of the project on them. As noted in your letter, WPAFB has completed extensive survey work in an effort to identify historic properties throughout the base. Therefore, we do not anticipate much discussion regarding the eligibility of properties for listing in the National Register. The primary question at this point is whether the Areas of Potential Effects should be enlarged and, if so, if the expanded boundaries will include additional historic properties.

Currently, WPAFB has identified a single historic property as being "within or adjacent" to one of the Areas of Potential Effects for the project. The Huffman Prairie Flying Field (HPFF), a National Historic Landmark, is located adjacent to the eastern boundary of the APE for the site north of Hebble Creek Road. Your letter states that, should this site be selected, efforts will be made to minimize the effects of the project on HPFF. Installation of a fence similar to the existing wire fence outlining the boundary of HPFF will be intended to minimize visual effects [we are concerned that using a similar type of fencing may confuse visitors to HPFF] and numerous operational controls could be implemented to "generate awareness and help alleviate the impact" on visitors to HPFF.

We note that WPAFB's efforts to minimize effects of the project on HPFF suggest that the historic property should be included within the APE, rather than being adjacent to it. In addition, it is our opinion that the various operational controls proposed in your letter may make visitors to HPFF more aware of activities being conducted adjacent to the historic property, but will do little to minimize the auditory effects resulting from operation of the EOD range that will be at odds with the desired visitor experience at the flying field. In short, the operation of the EOD range in such close proximity to HPFF has considerable potential to significantly change the setting of the historic property in a way that compromises its historic integrity (i.e. result in an adverse effect).

Should WPAFB elect to pursue construction of the EOD range at the Hebble Creek Road site, it will need to prepare considerably more documentation to facilitate Section 106 consultation, with an emphasis on analysis of how auditory effects could alter the setting of the National Historic Landmark Huffman Prairie Flying Field.

We encourage WPAFB to strongly consider constructing the EOD range at either the site north of the intersection of Riverview and Symmes Road or the site northeast of State Route 235 and east of Haddix Road. While we will need additional information and analysis regarding the delineation of the Areas of Potential Effects for these locations, existing inventory data suggests that construction of the proposed facility at these sites has significantly less potential to affect historic properties.

Jan Ferguson
January 20, 2009


Page Three

We will continue our review when we receive the requested information. If you have any questions, please contact me by phone at (614) 298-2000 or by email at jcook@ohiohistory.org. Thank you for your cooperation.

Sincerely,



Justin M. Cook, History Reviews Manager
Resource Protection and Review



Copy: Ann Honious, Chief, Education and Resources Management,
Dayton Aviation Heritage National Historical Park, P.O. Box 9280,
Dayton, Ohio 45409
Anthony F. Sculimbrene, Executive Director, National Aviation Heritage Alliance,
P.O. Box 414, Wright Brothers Station, Dayton, Ohio 45409

OHPO Serial # 1022174

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4/3/2009

WPAFB Clarification



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

3 April 2009

88 ABW/CEVO
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

Mr. Mark Epstein
Department Head, Resource Protection & Review
Ohio Historic Preservation Office
1982 Velma Avenue
Columbus OH 43211-2497

Dear Mr. Epstein

This is in response to your correspondence dated 20 January 2009 regarding the proposed construction and operation of an Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range at Wright-Patterson Air Force Base (WPAFB). In your letter you requested WPAFB to provide more information and analysis regarding the delineation of the Areas of Potential Effects (APE) for the proposed sites. In accordance with 36 CFR 800.11(e), we are submitting the following documentation.

In our 24 October 2008 correspondence we stated the following proposed locations for the EOD range were being evaluated in our environmental assessment (EA):

- I. Former EOD range, Area C
- II. Property north of Hebble Creek Road and west of the Huffman Prairie Flying Field, Area C
- III. Sand Hill Site, Area C

A fourth location, the Skeel Avenue Site in Area C, has recently been selected for evaluation in the EA. See Attachment 1 for maps of the four proposed locations and the revised APEs. You are also informed that the 300-foot radius for non-combustible materials has now been reduced to a 200-foot radius.

The APE boundary for each site has been extended to a 3000-foot radius from the center of the EOD range based upon the noise sound waves and projected sound (decibel) levels extending away from the detonation point. The noise impacts were based upon information gathered from Army and Navy assessments of military munitions operations. Attachment 2 contains a section from our draft EA which evaluates the potential noise impacts based upon the military studies. The results of these studies concluded that due to the low frequency sound energy produced from the detonation of small explosive charges (i.e. 5 pounds of C-4), humans outdoors do not perceive the sound levels as relatively high, but if they are indoors they become aware of the vibrations through building rattles. As with any sudden explosive noise, humans may typically react with a "jerk or jolt" reaction. The 1250 foot and 3000 foot radii on the site maps are based upon sound levels measured from a five-pound blast at Fort Lewis, Washington. The Naval Surface Weapons Laboratory, Virginia, published a noise manual which included reference sound level peaks for use in determining potential risk of complaints (see Tables 3.9-1 and 3.9-2 in Attachment 2).

In addition, we utilized Department of Defense software to perform a blast analysis for the detonation of the maximum quantity of explosive materials (5 pounds of C-4) that would be detonated inside the six-

foot tall concrete containment barrier during the EOD training operations. The results of the blast analysis (Attachment 3) concluded that at 100 feet from the point of detonation there would be zero percent probability of injuries to people and that there would be no structural impacts to building beams, floors, walls, columns or glass windows.

The Air Force EOD Training Program aims to produce professional, highly qualified, technically proficient EOD teams capable of safely and efficiently performing peacetime and wartime EOD missions. EOD proficiency training enables EOD teams to achieve and maintain a level of competency to safely and effectively deal with explosive hazards. In accordance with Air Force Instruction 32-3001, Air Force Materiel Command Supplement 1, *Explosive Ordnance Disposal Program*, 2 May 2006, all EOD personnel at flight level are required to participate in unit training.

Description of the Undertaking's Effects on Historic Properties. Listed below is our assessment of the potential effects on historic properties based upon the potential impacts from the construction and operation of the EOD range at each proposed site.

Skeel Avenue Site. This site is located on the northern boundary of the Huffman Prairie in Area C of WPAFB, just south of the Airfield Hazardous Cargo Pads. There are two historic properties within the APE and one adjacent. They are listed as follows with the distance from the point of detonation:

- Approximately 2450 feet to the east is the western boundary of the Brick Quarters Historic District
- Approximately 2450 feet to the southwest is the eastern boundary of the Huffman Prairie Flying Field (HPFF)
- Approximately 3600 feet to the northeast is the southwestern boundary of the Fairfield Air Depot Historic District

The closest historic structure/building is approximately 2450 feet away from the detonation point. Based upon the blast analysis there would be no structural impacts to any historic building, nor should there be any building rattle disturbance to residents living inside the Brick Quarters. In addition, there is zero percent probability of physical injury to visitors of the HPFF or any other personnel outside of the secured fenced-in 500 foot clear zone. Depending on where the visitor is located on the HPFF, there is a low to moderate risk of receiving complaints from the detonations based upon the noise predication guidelines established by the Naval Weapons Service Center (Table 3.9-1, Attachment 2). There is also a low to moderate risk of receiving complaints from the residents living in the Brick Quarters Historic District as a result of the noise produced from the detonations. With the appropriate notifications and awareness education of the EOD range operations to the Brick Quarters residents and HPFF visitors, it is our opinion that this site has a low potential of significantly disturbing the desired visitor experience at the flying field and disrupting residential life. Therefore, it is our opinion that EOD operations at this site would not adversely affect the setting or historic integrity of the HPFF or any other historic property.

Former EOD range. This site is located in Area C of WPAFB north of the intersection of Riverview and Symmes Road, approximately 400 feet east of the Mad River. There are two historic properties within the APE and one adjacent. They are listed as follows with the distance from the point of detonation:

- Approximately 900 feet to the west is historic archaeological site 33GR1023, which is eligible for listing on the National Register of Historic Places (NRHP). This site is referred to by

nineteenth century mapping and literature as Kneisly Village, which was occupied from the mid-nineteenth century through to the construction of the Huffman Dam, in the early twentieth century. Attachment 4 contains the Ohio Archaeological Inventory (OAI) Form.

- Approximately 3000 feet to the southeast is prehistoric archaeological site 33GR918, which is eligible for listing on the NRHP. The interpretation of this site reveals it as a short-term, single-resource Archaic campsite. Attachment 4 contains the OAI Form.
- Approximately 3900 feet to the southeast is the western boundary of the HPFF.

Based upon the blast analysis there would be no structural impacts to the archaeological sites. In addition, there is zero percent probability of physical injury to visitors of the HPFF or any other personnel outside of the secured fenced-in 500 foot clear zone. For HPFF visitors, there is a low risk of receiving complaints from the detonations based upon the noise predication guidelines established by the Naval Weapons Service Center (Table 3.9-1, Attachment 2). It is our opinion that this site has a low potential of significantly disturbing the desired visitor experience at the flying field and does not adversely affect the setting or historic integrity of the HPFF or any other historic property.

Hebble Creek Road Site. The proposed EOD range at this location is north of Hebble Creek Road and approximately 900 feet west of the western boundary of the HPFF. There are two historic properties within the APE. They are listed as follows with the distance from the point of detonation:

- Approximately 900 feet to the east is the western boundary of the HPFF.
- Approximately 3000 feet to the north is prehistoric archaeological site 33GR918.

Based upon the blast analysis there would be no structural impacts to the archaeological site or HPFF. In addition, there is zero percent probability of physical injury to visitors of the HPFF or any other personnel outside of the secured fenced-in 500 foot clear zone. To address your concerns regarding visitor confusion regarding the type of fencing around the EOD range, it is proposed that a different fence, such as chain link fence be installed. Depending on where the visitor is located on the HPFF, there is a moderate to high risk of receiving complaints from the detonations based upon the noise predication guidelines established by the Naval Weapons Service Center (Table 3.9-1, Attachment 2). It should be noted that all of the HPFF interpretive signs, structures and walking trails are located in the 129 decibel range or the moderate risk level for receiving complaints. We recognize that this site primarily has a moderate potential of causing increased complaints from visitors of the flying field. We contend this is also subjective, based upon the visitor's perception and understanding of HPFF being located on an active military installation. Consequently, it is difficult for us to make an assessment of the impact to the historic integrity of the HPFF solely based upon visitor experience when the law addresses the effects on historic properties. However, as with the Skeel Avenue Site, we feel that with the appropriate notifications and awareness education of the EOD range operations to the HPFF visitors, the potential risk for disturbing the visitor experience would be reduced.

The EOD range is a mission essential activity and is another source of noise surrounding the HPFF. Due to the very short duration (less than one second) of the blasts and the frequency of the training operations (at maximum, one blast per hour, three days/week, Monday – Friday), it is our opinion that the overall visitor experience at the HPFF would not be significantly impacted. According to the National Park Service (NPS) visitation statistics for the ranger-guided tours, the majority of the visits to the HPFF are on the weekends, especially Memorial Day through Labor Day. The EOD range would not be in operation for routine training activities during the weekends, and would only be used on the weekends for

emergency disposal situations. NPS statistics also indicate that during the months of May, late August, and September the majority of visitors occur during the weekdays, Tuesday and Thursday, in the form of school groups. Hence, coordination between WPAFB and the NPS would be critical to ensure minimal disruption to both EOD operations and NPS activities at the HPFF.

The historic integrity of the HPFF has been maintained for the past several years by WPAFB while coexisting with the following past and present forms of nearby noise generating activities: daily flying of C-5 aircraft, hunting, shotgun skeet range, and operation of the former outdoor Combat Arms Training and Maintenance Range. We feel that with the appropriate coordination with the NPS and implementation of both public education outreach measures, along with the operational mitigative measures outlined in our 24 October 2008 correspondence, the potential risk of visitor complaints would be significantly reduced to low probability. With the implementation of increased NPS coordination and the educational and operational measures, we believe that this site has a low potential of significantly disturbing the desired visitor experience at the flying field. Therefore, it is our opinion that EOD operations at this site would not adversely affect the setting or historic integrity of the HPFF or any other historic property.

Sand Hill Site. The proposed EOD range at this location is northeast of State Route 235 (Chambersburg Road) and east of Haddix Road. There are no known historic properties located within or adjacent to the APE.

Finding of No Adverse Effect. It is our opinion that if the EOD range was sited at the Skeel Avenue Site, Former EOD Range, Hebble Creek Road Site, or Sand Hill Site that no adverse effects would occur to historic properties. WPAFB has worked very hard and is committed to maintaining the historic integrity of the HPFF while co-existing with an active military installation that continues to grow and increase with mission essential activities. It is our opinion that if the EOD range was located at the Hebble Creek Road Site, we would continue to implement the necessary measures to maintain its eligibility as a National Historic Landmark.

Please review the documentation we have provided and let us know whether you concur with the no adverse effect determination. Should you have any questions, please contact Mr. Raymond Baker at (937) 257-0177, or via e-mail at raymond.baker@wpafb.af.mil.

Sincerely



JAN FERGUSON
Chief, Operations Branch
Environmental Management Division

Attachments

1. Site Maps
2. Draft EA Noise Section
3. Blast Analysis
4. OAI Forms

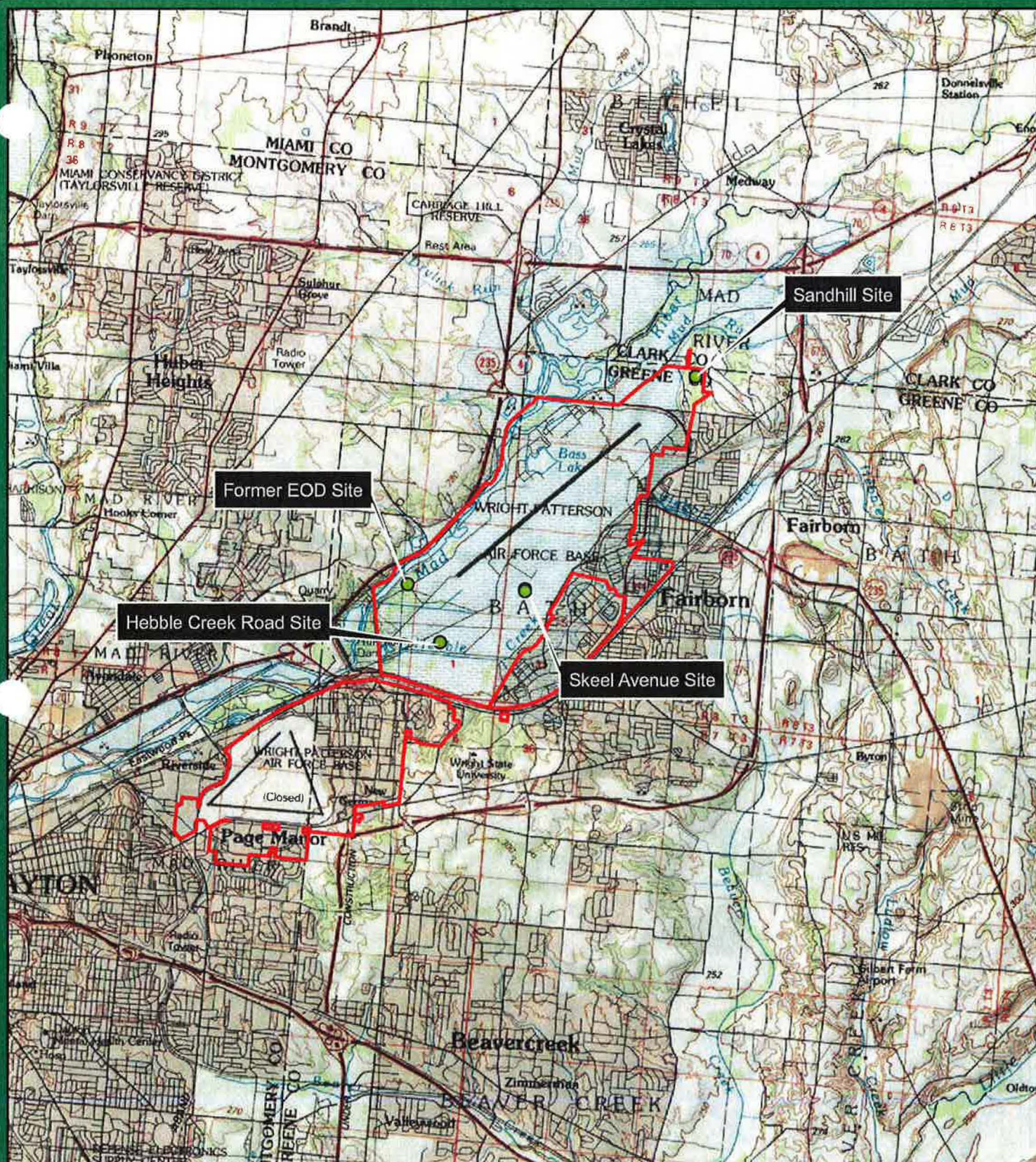
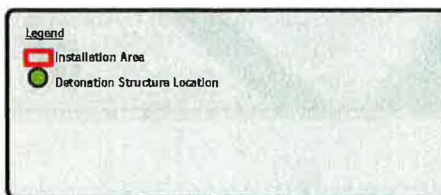
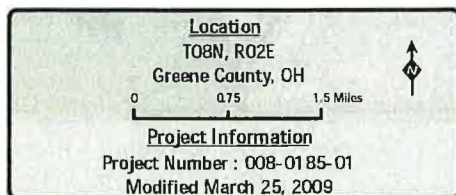


Figure 1.1. Project Location and Topography
Wright-Patterson Air Force Base

DRAFT



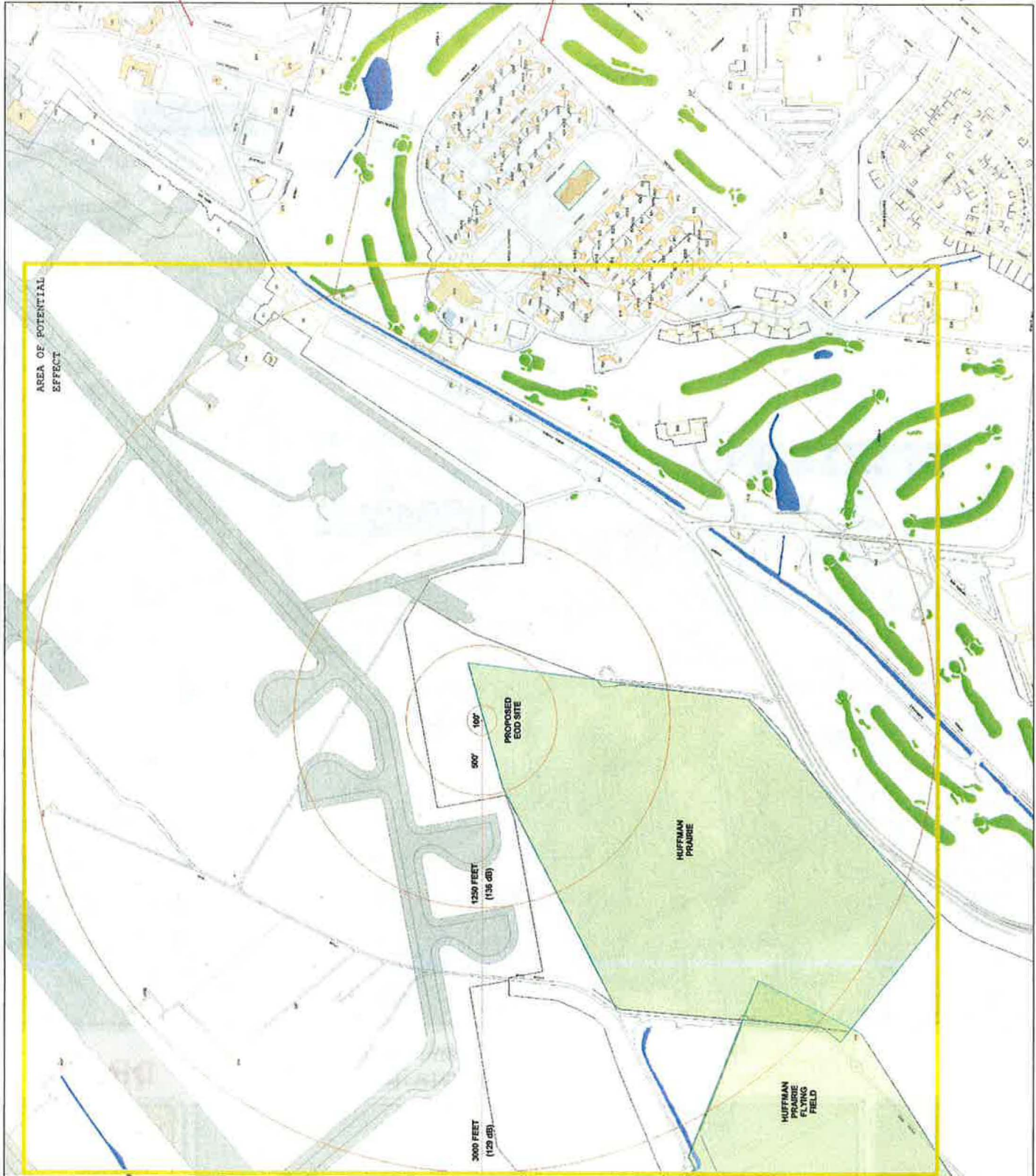
- LEGEND
- ARTIFICIAL SURFACES AREA
 - WETLANDS
 - WETLANDS OUTLINE AREA
 - WETLANDS OUTLINE AREA
 - WETLANDS OUTLINE AREA
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 - WETLANDS OUTLINE AREA

Fairfield Air Depot
Historic District

Brick Quarters
Historic District

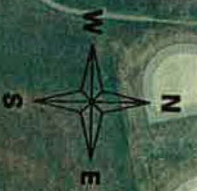


WRIGHT PATTERSON AIR FORCE BASE, OH
ENVIRONMENTAL MANAGEMENT
PROPOSED EOD SITE AND
BRICK QUARTERS HISTORIC DISTRICT
—PROPOSED EOD SITE ONLY



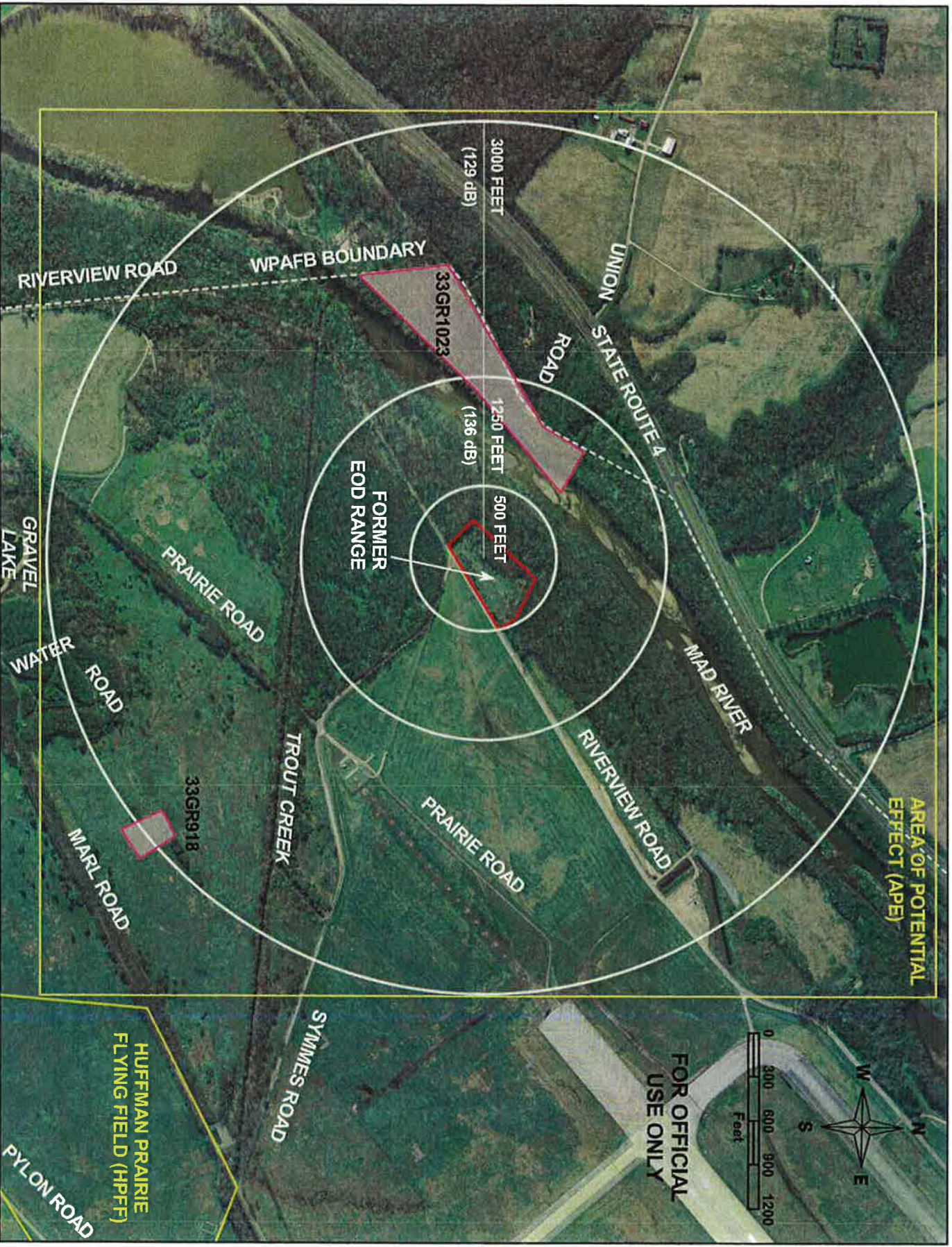
SKEL AVENUE

FOR OFFICIAL USE ONLY



HEBBLE CREEK ROAD SITE

FORMER EOD RANGE





SAND HILL SITE

Environmental Assessment: Explosives Ordnance Proficiency Training and Disposal Range - DRAFT
Wright-Patterson AFB
Contract No. FA4890-04-D-0006, ECAS Log #568

Tetra Tech, Inc.
October 2008
REVISED: MARCH, 2009

1696 In 2004, WPAFB was issued a Title V air quality operating permit identifying all major sources of air
1697 pollutants. Emissions due to the operation of the EOD facility are not expected to be classified as de
1698 minimus and as such, a permit to install application must be submitted for approval. The emissions unit
1699 will also need to be added to the Title V permit. See Section 4.8 for details.

1700 **3.8.1 Alternative 1: Former EOD Site**

1701 The former EOD location is situated between Riverview Road and the Mad River on the western edge of
1702 Area C. The predominant wind would generally direct potential emissions and/or odors resulting from
1703 operation of the EOD activities toward the WPAFB airfield. Off-site migration of emissions are unlikely
1704 from this proposed location.

1705 **3.8.2 Alternative 2: Hebble Creek Road Site**

1706 The Hebble Creek Road Site is located between Marl Road and Hebble Creek Road. The predominant
1707 wind would generally direct potential emissions and/or odors resulting from operation of the EOD
1708 activities toward the north-northeast. Off-site migration of emissions are unlikely from this proposed
1709 location, however, if they occur, emissions may be directed toward the Huffman Prairie Flying Field
1710 which is frequented by the general public as a tourist attraction.

1711 **3.8.3 Alternative 3: Sandhill Location**

1712 The Sandhill Location is located at the northernmost end of WPAFB. Should emissions and/or odors
1713 occur from EOD activities, off-site migration toward a residential development is feasible.

1714 **3.8.4 Alternative 4: Skeel Avenue Site**

1715 The Skeel Avenue Site is located the eastern portion of WPAFB southeast of the airstrip. The site is
1716 located slightly less than 3000' upwind from a residential area east of the base. Considering predominant
1717 wind direction (from southwest), emissions and/or odors which may occur from EOD activities have the
1718 potential to migrate off-site toward this residential development.

1719 **3.9 NOISE**

1720 Sound is a waveform that travels through media including air, water and structural materials such as wood
1721 and steel. The level of noise impacts are based on the magnitude of one or more of the noise
1722 characteristics, namely, sound level (amplitude), frequency (pitch), and duration. The amplitude of a
1723 sound wave is equivalent to what we perceive as loudness. Since sound is a compression wave, its

loudness or amplitude would correspond to how much the wave is compressed. A common measurement of loudness is the decibel (dB). Frequency is the rate that the maximum compressions pass a given point in a second. The unit of frequency is the hertz (Hz), Audio frequencies are those that are within the human range of hearing (approximately 20 Hz to 20,000 Hz).

Amplitude is further refined by including frequency as a "weighting" factor. An Operational Noise Manual prepared by Operational Noise Program Directorate of Environmental Health Engineering - U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), for DOD facilities, describes A-weighted as the primary descriptor of sounds detected by humans (dBA) which is generally 1,000 to 4,000 Hz range. The manual also describes C-weighting which is used for intense low frequency signals (near or below the threshold of human hearing) such as munitions blasts that tend to create building rattles and vibrations.

An explosion causes a sudden surge in air causing a high-volume sound. The spectra of military explosives usually contain more low frequency sounds as opposed to the confined explosions of guns. The typical spectrum from a 5 lb. charge of plastic explosive (C4) has the most energy at 31 Hz. Since humans detect noises best which are greater than 1000 Hz, these explosions are often not perceived as being relatively loud. Such low frequencies can travel much longer distances than can higher frequency sounds because they are less likely to be absorbed by other materials in their path. This makes very low frequency sounds useful in applications such as low frequency sonar. Low frequency sound waves are more likely than higher frequency waves to cause vibration in wood and steel structures, such as buildings near an explosion site.

The spectrum of uncontained explosions is related to the size of the explosion in that the larger the explosion, the lower the spectrum. Thus, charges smaller than 5 lbs. have a spectrum peaking at a frequency higher than 31 Hz, and charges larger than 5 lbs. have a spectrum peaking at a frequency lower than 31 Hz. When explosions have a spectral energy below 20 Hz (like those near demolition grounds, bombing ranges, or artillery impact areas) people barely notice an explosion when outdoors but, because of induced vibrations, become intensely aware of the vibrations when they step inside their homes. Based on the above discussions, an adverse noise impact is possible with the potential for structural damage, and annoyance to public.

The Air Installation Compatible Use Zone (AICUZ) study report for Wright-Patterson Air Force Base, prepared in 1995 provides noise contours. The noise contour methodology used in the AICUZ is the Day-Night Average A-Weighted Sound Level (DNL) metric, adopted by the Environmental Protection

Agency (EPA) as the standard noise prediction metric. The AICUZ report contains noise contours plotted in increments of 5 dB, ranging from DNL 65 dB to DNL 80 dB. The AICUZ land use development policy recommends no residential uses in noise zones above DNL 75 dB, strongly discourages residential development from 70 – 74 dB and discourages residential development from 65 – 69 dB.

These areas may not qualify for federal mortgage insurance in residential categories according to the Department of Housing and Urban Development (HUD) Regulation 24 CFR 5IB. In many cases, HUD approval requires noise attenuation measures, the Regional Administrator's concurrence, and an Environmental assessment. Whenever possible, residential land use should be located below DNL 65 dB according to Air Force land use recommendations.

The Naval Surface Weapons Laboratory (NSWL), in Dahlgren, Virginia published a noise manual which included reference sound level dB peaks for use in determining potential risk of complaints. Pertinent tables are included below:

Table 3.9-1:
Gun Noise Complaint Prediction Guidelines: Naval Surface Weapons Center (Source: Noise Manual, USACHPPM)

Predicted Sound Level, dB Peak	Risk of Complaints	Action
< 115	Low	Fire all programs
115 – 130	Moderate	Fire important tests. Postpone non-critical testing, if feasible.
130 – 140	High, possibility of damage	Only extremely important tests should be fired.
> 140	Threshold for permanent physiological damage to unprotected human ears. High risk of physiological and structural damage claims	Postpone all explosive operations.

An environmental assessment prepared for a proposed EOD Demolition Training Range at the Seaplane Base, NASWI (July 2000) notes that noise levels were measured during a test of a 5-lb detonation at Fort Lewis in Washington State in 1999. The table below provides the measured levels:

Table 3.9-2:

Measured 5-lb Explosive Source Noise Levels (Source: After measurements at Fort Lewis, Washington State; cited in Environmental Assessment – EOD Demolition Training Range, Seaplane Base, NASWI, Department of Navy, July 2000)

Location	Unweighted peak (dB)	C-weighted L _{max} (dB-C)	A-weighted L _{max} (dB-A)
At 1,250 ft	136	124	99
At 3,000 ft	129	118	83

Depending on the magnitude of peak noise levels, as well as frequency (Hz), duration, meteorological conditions, time of day, number of detonations per day and week, and specific receptor location, the increased peak noise could cause impacts ranging from annoyance to short-term pain.

From the above tables, it can be concluded that, as a conservative estimate, unweighted peak noise levels of 129 dB at 3,000 feet away from detonation point will result in moderate complaints, and therefore will require only firing “important tests”. The subjectivity of “important tests” may be equated to EOD training for 8 hours a day, three times per week. Based on this assumption, potential environmental consequences and mitigation measures are discussed in Section 4.0.

Construction activity can also result in noise impacts depending on the magnitude, duration and vicinity to residential area. The duration of constructing the blast containment structure, and gravel access road and parking area, is assumed to be not more than one month and will pose only short term impacts.

3.10 HEALTH AND SAFETY

The proposed EOD activities at each of the four (4) locations are inherently dangerous as even controlled detonation of explosives can be injurious to those involved and pose potential hazards to nearby operations. WPAFB serves as the hub of transportation for military aircraft and it has established aircraft Accident Potential Zones in which potentially harmful activities are strictly limited. As such, the Air

**Blast Effects on the Environment
Around 5# C-4
Detonation Bunker**

The subject bunker blast environment was analyzed for the blast effects of a 5# C-4 ground burst in a 6' high vented concrete bunker. The analysis results on the bunker and its surrounding, up to 100' standoff distance from the burst point are as follows:

- 1. Subjected to the maximum shock effects of 31.69 psi incident overpressure, 24.96 psi-ms impulse, 101.39 psi reflected pressure and 65.48 psi-ms reflected impulse the bunker walls had no damage.**
- 2. At a 100' standoff distance from the burst point, no blast effects were recorded. The shock front had dissipated to nothing. People asset located at this distance from the detonation point had no injury from the blast.**

See the attachment for detail.

**Victor Erewele, MS. PE.
Structural Engineer.**

3/27/2009

Blast/FX Summary Report

Wednesday, March 18, 2009

Building

No. of Levels: 1

BUNKER

Height: 6.0 (ft)

Elevation: 0.0 (ft)

No. of Components: 6

Population: 4

Scenario

Name: 5#-C4 AT DETONATION

Description: 5#-C4 AT DETONATION

Device: 5#-C4

Description: 5#-C4

Compound: Composition C-4

Charge: 5.0 (lbs)

TNT Equiv: 6.4 (lbs)

Case Wt: 1.0 (lbs)

V Initial: 10518 (fps)

Device Position: (0.0, 0.0, 0.0) (ft)

Population Set: POEPLA AT 100 FEET

Description: PERSONS AT 100' DISTANCE FROM DETONATION POINT.

No. of People: 4

Casualties

Fatalities: 0 / 0%

Serious Injuries: 0 / 0%

Slight Injuries: 0 / 0%

Uninjured: 4 / 100%

Damage

	Destroyed	Severe	Moderate	Undamaged	Total
Beams	0	0	0	0	0
Columns	0	0	0	0	0
Floors	0	0	0	0	0
Walls	0	0	0	6	6
Total	0	0	0	6	6

Glass Lites: 0

Broken: 0

Blast/FX v2.2: Query Results

Pos: 0.1, 99.8

Overpressure : 0.00 psi
Impulse : 0.00 psi-ms
Duration : 0.00 ms
Fragment Density : 0.00 per sq ft
Distance from Device : 99.81 ft

Hazard Severities:

Overpressure : NONE
Fragmentation : NONE
Glass : NONE
Debris : NONE
Collapse : NONE

Injury Probabilities:

	At least Slight	At least Serious	Fatal
Overpressure	0.000	0.000	0.000
Fragmentation	0.000	0.000	0.000
Glass	0.000	0.000	0.000
Debris	0.000	0.000	0.000
Collapse	0.000	0.000	0.000

Overall	0.000	0.000	0.000

Blast/FX v2.2: Query Results

Type: WALL (BUNKER WALL)

Pos: -26.0, 10.5

Overpressure	: 31.69 psi
Impulse	: 24.96 psi-ms
Duration	: 3.03 ms
Fragment Density	: 0.40 per sq ft
Distance from Device	: 10.50 ft
Reflected Pressure	: 101.39
Reflected Impulse	: 65.48
Glass Fragmentation	: n/a
Glass Breaking Pres.	: 1.00

Damage : 0%

Collapsed : NO

OHIO ARCHAEOLOGICAL INVENTORY

*Response required for acceptance of form

~~for official use only~~

Coder _____

Date _____

A. Identification

*1. Type of Form (select as many as appropriate):

____ New Form ☒ Revised Form ____ Transcribed Data2. County Greene *3. Trinomial State Site Number 33- Gr - 10234. Site Name(s) Kneisly5. Project Site Number 8

6. Other State Site Number _____

7. Source (of Item A.5. and/or A.6.) 1996 Kreinbrink, King and Adams
"Report for Archaeology Survey of 35 locations at Wright-
Patterson Air Force Base, Fairborn, OHIO."**B. Location***1. UTM Zone ☒ 16 or ____ 17Easting 749 620 ____ 0Northing 4410 7640 ____ 0

2. Latitude ____

Longitude ____

*3. Township 2 Range 8 Not Applicable ____Section 8 1/4 Section: ____ SW ____ SE ____ NW ____ NETownship Name Bath*4. Quadrangle Name Fairborn, Ohio*5. Quadrangle Date 1992*6. Confident of Site Location ☒ Yes ____ No**C. Ownership***1. Name(s) Wright-Patterson Air Force Base

Address _____

City/Town, State, Zip _____

Phone (____) _____

2. Tenant (if any) _____

Address _____

City/Town, State, Zip _____

Phone (____) _____

*3. Ownership Status (select only one, as appropriate):

____ Private (single)

____ Private (multiple)

____ Local Govt.

____ State Govt.

☒ Federal Govt.

____ Multiple Govt.

____ Mixed-Govt./Private

____ Unknown

D. Temporal Affiliations

*1. Affiliations Present (select only one, as appropriate):

____ Prehistoric

☒ Historic

____ Prehistoric and Historic

____ Unknown

____ Unrecorded

 Plotted ☐
 *Site No. 33- Gr - 1023

~~for official use only~~**Prehistoric**

*2. Prehistoric Temporal Period(s) Represented (select as many as appropriate)

☐ Unassigned Prehistoric ☐ Paleoindian
 Archaic: ☐ Unassigned ☐ Early ☐ Middle ☐ Late
 Woodland: ☐ Unassigned ☐ Early ☐ Middle ☐ Late
☐ Late Prehistoric ☐ Protohistoric ☐ Other (specify) _____

*3. Minimum Number of Prehistoric Temporal Periods Represented _____

*4. Basis for Assignment of Prehistoric Temporal Period(s) (select as many as appropriate):

☐ Diagnostic Artifacts ☐ Diagnostic Features ☐ Radiometric
☐ Unrecorded ☐ Other (specify) _____

5. Prehistoric Cultural Component(s) Represented (see manual):

- a. _____
 b. _____
 c. _____
 d. _____
 e. _____
 f. _____

6. Describe how Prehistoric Temporal Period(s) and Cultural Component(s) were determined (list diagnostic artifacts and/or features; include type names, attach photographs and/or illustrations, and identify researcher). When listing artifacts and/or features please specify Prehistoric Cultural Component(s) by using letter designations from Item D.5.

Researcher _____

*7. Categories of Prehistoric Materials Present at Site (select as many as appropriate)

☐ Lithics ☐ Ceramics ☐ Metal ☐ Faunal Remains ☐ Floral Remains
☐ Human Skeletal Remains ☐ Unrecorded ☐ Other (specify) _____

8. Specific Prehistoric Cultural Materials Collected:

Type	Count	Type	Count
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Historic

*9. Affiliation Present (select only one, as appropriate):

☐ Aboriginal ☒ Non-Aboriginal ☐ Both ☐ Undetermined

*10. Historic Temporal Period(s) Represented (select as many as appropriate):

a. ☐ Pre-1795 b. ☐ 1796-1829 c. ☐ 1830-1849
 d. ☒ 1850-1879 e. ☒ 1880-1899 f. ☒ 1900-1929
 g. ☒ 1930-1949 h. ☒ 1950-1974 i. ☐ 1975-2000
 j. ☐ Historic k. ☐ 18th Century l. ☒ 19th Century
 m. ☒ 20th Century n. ☐ Historic Aboriginal

~~for official use only~~

*11. Minimum Number of Historic Temporal Periods Represented 5

*12. Basis for Assignment of Historic Temporal Period(s) (select as many as appropriate):

☒ Diagnostic Artifacts ☒ Diagnostic Architectural Remains
☐ Diagnostic Features ☒ Documentary Evidence ☐ Oral Tradition
☐ Unrecorded ☐ Other (specify) _____

13. Describe how Historic Temporal Period(s) were determined (list any diagnostic architectural remains, diagnostic artifacts and/or features; include type names, attach photographs and/or illustrations, and identify researcher). When listing artifacts and/or features specify Historic Temporal Period(s) by using letter designations from Item D.10.

Researcher _____

*14. Functional Categories of Historic Materials Present at Site (select as many as appropriate):

☒ Kitchen ☐ Furniture ☒ Personal
☐ Toys & Games ☐ Printed Matter ☐ Religious/Ceremonial
☐ Military ☐ Weapons ☐ Transportation
☒ Architectural ☐ Misc. Hardware ☐ Const./Manufacturing Tools
☒ Agricultural ☐ Fuel/Energy ☐ Food Remains
☐ Clothing ☐ Unrecorded ☐ Unknown
☐ Other (specify) _____

15. Specific Historic Cultural Materials Collected: (NES, Inc.)

Type	Count	Type	Count
<u>Ceramic - Whiteware - plain</u>	_____	<u>Ceramic - Ironstone</u>	_____
<u>" " - shell edge</u>	_____	<u>Ceramic - Redware</u>	_____
<u>" " - transfer</u>	_____	<u>Glass - Milk</u>	_____
<u>" " - flow blue</u>	_____	<u>Glass - Container</u>	_____
<u>" " - handpainted</u>	_____		_____
<u>Window glass - aqua</u>	_____		_____
<u>Cut nail</u>	_____		_____

General

16. Describe Prehistoric and/or Historic Cultural Materials observed but not collected. State reason(s) for not collecting.

No diagnostic artifacts were
observed or collected during
shovel testing

17. Affiliated Ohio Historic Inventory Site Number and Name:

~~for official use only~~**Physical Description**

*1. Archaeological Setting (select only one, as appropriate):

☐ Rockshelter/Cave ☒ Open ☐ Unrecorded ☐ Unknown
☐ Submerged ☐ Other (specify) _____

*2. Prehistoric Site (select as many as appropriate):

Habitation: ☐ Camp ☐ Village ☐ Hamlet ☐ Unspecified Habitation
 Extractive: ☐ Quarry ☐ Workshop
 Ceremonial: ☐ Unspecified Mound ☐ Earth Mound ☐ Stone Mound
☐ Effigy Mound ☐ Mound Group ☐ Hilltop Enclosure
☐ Geometrical Earthwork ☐ Cemetery ☐ Isolated Burial(s)
☐ Petroglyph/Pictograph

Other: ☐ Unknown ☐ Unrecorded ☐ Other (specify) _____

*3. Historic Site Type (select as many as appropriate):

☒ Residential ☒ Commercial ☐ Social ☐ Government
☐ Religious ☐ Educational ☐ Mortuary ☐ Recreation
☐ Subsistence ☒ Industrial ☐ Health Care ☐ Military
☒ Transportation ☐ Unrecorded ☐ Unknown
☐ Other (specify) _____

4. State the bases on which site type assignment(s) were made.

*5. Site Condition (select only one, as appropriate):

☐ Undisturbed ☒ Disturbed - Extent Unknown ☐ Fully Disturbed
☐ Destroyed ☐ Unrecorded ☐ Unknown

*6. Dominant Agent(s) of Disturbance (select as many as appropriate):

☐ None Apparent ☐ Agriculture ☐ Historic Construction ☒ Water
☐ Transportation ☐ Archaeological Excavation ☐ Mining ☐ Vandalism
☐ Unrecorded ☐ Other (specify) _____

7. Nature of Disturbance/Destruction:

*8. Current Dominant Land Use (see manual):

Military Base

9. Land Use History:

*10. Site Elevation (790-800 ft) ²⁴¹⁻²⁴⁴ Meters A.M.S.L. (elevation to be taken from UTM point)

*11. Physiographic Setting of Site (select only one, as appropriate):

☒ Lake Plain ☐ Lexington Peneplain ☐ Unglaciaded Plateau
☒ Till Plain ☐ Glaciaded Plateau ☐ Unrecorded

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*12. Glacial Geomorphology (select only one, as appropriate):

- ☐ Not Applicable ☐ Wisconsin End/Lateral Moraine
☐ Kansan Ground Moraine ☐ Wisconsin Kame/Kettle/Esker/Drumlin
☐ Illinoian Ground Moraine ☐ Wisconsin Lacustrine Deposit
☐ Illinoian Outwash ☐ Post Wisconsin Lacustrine Deposit
☐ Wisconsin Ground Moraine ☒ Wisconsin Outwash
☐ Unrecorded ☐ Other (specify) _____

*13. Regional Geomorphological Setting (select only one, as appropriate):

- ☒ Stream Valley ☐ Upland Hill Slope ☐ Beach Ridge
☐ Hill or Ridge Top ☐ Lake Plains Interfluvial Zone ☐ Unrecorded

*14. Local Environmental Setting (select only one, as appropriate):

- Terrace: ☐ Unknown ☐ T-1 ☐ T-2 ☐ T-3 ☐ T-4
☐ Beach Ridge ☐ Terrace Remnant ☐ Natural Levee ☒ Floodplain
☐ Low Rise on Floodplain ☐ Alluvium ☐ Island ☐ Kame ☐ Drumlin
☐ Esker ☐ Moraine ☐ Glacial Hummock ☐ Wetland Hummock
☐ Bluff ☐ Bluff Base ☐ Bluff Edge ☐ Saddle ☐ Hill or Ridge Top
☐ Closed Depression ☐ Unrecorded ☐ Other (specify) _____

*15. Soils:

- Soil Association Sloan - Ross - Algiers
 Soil Series-Phase/Complex Sloan silty clay loam
 Reference USDA Soil Survey of Greene County, Ohio (1978)

*16. Down Slope Direction (select only one, as appropriate):

- ☐ N ☐ NW ☐ NE ☐ E ☐ All ☒ Flat
☐ S ☐ SW ☐ SE ☐ W ☐ Unrecorded

*17. Slope Gradient (percent) 0 Unrecorded _____

*18. Drainage System (see manual):

- Major Drainage Great Miami River
 Minor Drainage Mad River

*19. Closest Water Source (select only one, as appropriate):

- Name: Mad River
☒ Permanent Stream ☐ Lake/Pond ☐ Ephemeral Stream
☐ Permanent Spring ☐ Swamp/Bog ☐ Intermittent Spring/Seep
☐ Slough/Oxbow Lake ☐ Artificial Lake/Pond (historic sites only)
☐ Artificial Stream/Ditch (historic sites only) ☐ Unrecorded
☐ Other (specify) _____

*20. Horizontal Distance to Closest Water Source 25 (meters from UTM point)21. Elevation Above Closest Water Source 4 (meters A.M.S.L. from UTM point)

F. Reporting Information

*1. Investigation Type (select as many as appropriate):

- ☐ Reported ☐ Examination of Collection ☒ Surface Collection
☒ Auger/Soil Corer ☒ Shovel Test(s) ☐ Test Pit(s) ☐ Test Trench(es)
☐ Deep Test(s) ☐ PZ or Humus Removal ☐ Testing/Excav. (strategy unknown)
☐ Mitigation/Block Excavation ☐ Aerial Photograph
☐ Remote Sensing (specify) _____
☐ Chemical Analysis (specify) _____
☐ Unrecorded ☐ Other (specify) _____

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. Surface Collection Strategy (select as many as appropriate):

☐ Not Applicable ☐ Grab Sample ☒ Diagnostics
☐ Controlled-Unknown ☐ Controlled-Total
☐ Controlled-Sample ☐ Unrecorded
☐ Other (specify) _____

3. If surface collection strategy is Controlled-Total, Controlled-Sample, or Other, describe methodology and percentage.

4. Surface Visibility (select only one, as appropriate):

☐ None ☒ Less than 10% ☐ 11-50%
☐ 51-90% ☐ 91-100% ☐ Unrecorded

5. Describe surface conditions.

*6. Site Area (square meters) 69,713 m²

Unrecorded _____

*7. Basis for Site Area Estimate (select only one, as appropriate):

☐ Guessed ☐ Historic Maps ☐ Aerial Photograph ☐ Paced
☐ Taped ☐ Transit/Alidade ☐ Range Finder ☐ Unrecorded
☒ Other (specify) GPS

*8. Confident of Site Boundaries: ☐ No ☒ Yes ☐ Unrecorded9. Estimated Percentage of Site Excavated ☐ Unrecorded ☐ Unknown10. Name of Form Preparer Almee L. Smith11. Institution BHE Environmental, Inc.*12. Date of Form (year/month) 04/06

2 0 ____/____

13. Field Date (year/month) 03/10, 04/02

2 0 ____/____

14. Time Spent at Site _____

15. Weather Conditions _____

16. Name(s), Address(es), Phone Number(s) of Local Informants

*17. Artifact Repository (ies) Wright-Patterson Air Force Base / Ohio
Historical Society

18. Name(s), Address(es), Phone Number(s) of Owners of Collections From Site (attach inventories of private collections).

~~for official use only~~

19. Photographs (select as many as appropriate):

No. of Slides _____ No. of Prints _____
Aerials: _____ Black/White _____ Color _____ Infrared

20. Name and Address of Institution Where Photos Are Filed (include photo log number if available)

*21. National Register Status (select only one, as appropriate):

- ☐ National Register Property†
☒ Determined Eligible for National Register†
☐ National Register Status Not Assessed
☐ Removed from National Register†
☐ Determined Not Eligible†

†Determination made by Keeper of the National Register (date) _____

22. State Registry Status (select only one, as appropriate)

- ☐ State Registry Listed†
☐ Not Assessed for State Registry
☐ Removed from State Registry†
☐ Determined Not Eligible†

†Determination made by Ohio Historical Society (date) _____

23. Discuss the potential significance of the site (does it meet National Register and/or State Registry criteria of significance in your opinion? Why or why not? Upon what evidence have you based your opinion?)

Site is believed to be eligible to the NRHP based upon criteria D (yield important information concerned with some aspect of history) and B (associated with lives of persons significant in our past). The site is associated with known historic figures dating to the early development of Greene County; structural remnants preserving spatial associations between historic activity loc across the extent of the former Knecoly village; nineteenth and early twentieth century

*24. Special Status (select only one, as appropriate):

- | | | |
|--------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> Wilderness Area | <input type="checkbox"/> Wildlife Preserve |
| <input type="checkbox"/> Park | <input type="checkbox"/> Scenic River | <input type="checkbox"/> Nature Preserve |
| <input type="checkbox"/> Forest | <input checked="" type="checkbox"/> Military Installation | <input type="checkbox"/> Archaeological Preserve |
| <input type="checkbox"/> Archaeological District | | <input type="checkbox"/> Unknown |
| <input type="checkbox"/> Other (specify) _____ | | |

~~for official use only~~**G. References** - List Primary Documentary References (see manual):

1. See page 1 ; Section A, #7
2. 2004 Bryant, Bergman and Leary
"Phase II testing of Eight Sites : 33 Gr 1021, 33 Gr 1023,
33 Gr 1024, 33 Gr 1028, 33 Gr 1029, 33 Gr 1030, 33 Gr 1032,
33 Gr 1033, Wright-Patterson Air Force Base, Greene County,
Ohio"
3. _____

H. Radiometric Dates

1. Material(s) Dated _____
 Date (uncorrected C14 years) _____
 Laboratory _____
 Sample # _____
 Reference(s) _____
2. Material(s) Dated _____
 Date (uncorrected C14 years) _____
 Laboratory _____
 Sample # _____
 Reference(s) _____
3. Additional Radiometric Dates Yes _____ No _____
 (use Continuation Section to list other dates)

I. Description of Site

- *1. State physical description of the site and its setting, including dimensions, features (with measurements), nature and location of artifacts and concentrations, extent and location of disturbances, etc.

SEE ATTACHED SHEET

I. Description of Site

1. State physical description of the site and its setting, including dimensions, features (with measurements), nature and location of artifacts and concentrations, extent and location of disturbances, etc.

Site 33Gr1023 is a historic occupation, referred to by nineteenth century mapping and literature as Kneisly Village, that was occupied from the mid-nineteenth century through to the construction of the Huffman Dam, in the early twentieth century. The site is located on the floodplain and western terraces of the Mad River. The majority of the site is currently covered by dense, tertiary-growth mixed hardwood forest interspersed with pockets of heavy undergrowth. This area occupies a gently-rising terrace on the western bank of the Mad River and extends between the edge of the river bank to the base of a steep, heavily-wooded eastern-facing slope. Several small, intermittent streams trend across the site, extending east from the western heights to empty into the Mad River. The main portions of the site rests atop a series of gentle rises within the low-lying watershed, and are currently five to seven ft (1.2-2.1 m) above the level of the river.

The 1996 Phase I Site Detection survey of NES, Inc. focused upon a 230 ft x 1000 ft area referred to as Test Area 8, located between Lower Valley Road and the Mad River. A grid of 40 15 m interval shovel tests was placed in an open forested area between the main cluster of structural remnants (Features 1-7, BHE Features A-I) and Feature 8 (BHE's Feature K). The soil in the shovel tests was characterized by about 8-20 inches (20 – 51 cm) of dark brown clayey silt. In some areas a gravel layer was noted that ranged between 4 to 8 inches (10-20 cm) thick at depths between 10 and 14 inches (25-36 cm) below surface (NES, Inc. 1996:3-9 to 3-10).

The results of the Phase I investigation included identification of eight structural remnants (Features 1-8). Features 1-5 are foundation remains, including the suspected remains of the Simms mansion, while Feature 6 is a brick stucco-covered wall fragment. Feature 7 is thought to be a portion of a mill consisting of a cut stone foundation remnant and Feature 8 is a possible foundation remnant. An additional foundation was located approximately 100 ft (31 m) south of Feature 7. The extensive presence of early nineteenth century materials in the Phase I catalog of NES, Inc. evidences the degree of historic activity indicated by Rogerson and Murphy's 1855 Greene County Atlas (Figure 5.2-2). Based upon the archival information, the presence of surface structural remnants, the possibility of preserved subsurface features, and the early historic artifact assemblage, NES, Inc. (1996:3-13) concluded that the site was potentially eligible for the NRHP.

When the 2003 field effort began on 30 October, thick underbrush and leaf litter made it difficult, if not impossible, to locate NES's previously identified features. It was also clear that identifying and mapping of site structural remnants and features would be more intensive than that which produced the 33Gr1023 sketch map provided in the NES, Inc. Phase I Site Detection survey. Despite the problems associated with visibility in October, BHE did observe more than the eight structural remnants initially recorded in 1996 by NES, Inc. (NES, Inc.1996).

Feature Location on 33Gr1023, Feature (alphabetic designation), and Feature Description.

Location on Site	Feature	Feature Description
In main feature cluster, central site area	A (NES, Inc. #3)	Concrete structure measuring 8 ft x 40 ft and approximately 6 ft high. An entrance to the foundation is located along the west wall, in the northwest corner of the foundation. Historic debris observed on the surface included window glass, miscellaneous glass fragments, ceramic fragments (Ironstone, Whiteware, Flow blue, Transferware, and Stoneware), nails, and brick.
In main feature cluster, central site area	B	Cement foundation remnant measuring 31 ft x 28 ft. A stepped entrance is situated in the northeast corner of the foundation. A poured cement floor covered with dark brown overburden is located within the foundation.
In main feature cluster, central site area	C (NES, Inc. #2)	Cement wall remnant measuring 23 ft long and 4 ft high. A cement trough, 11 ft x 5 ft, and 2 ft high is located at the northern end of the wall. A cobble stone pad 11 ft x 6 ft extends from the eastern wall of trough.
In main feature cluster, central site area	D (NES, Inc. #1)	Cement foundation, approximately 40 ft x 40 ft in dimension. A cement wall extends off of the east wall of the foundation. Wooden planks are lying against the north wall. A stone pillar is situated to the northwest of the structure.
In main feature cluster, central site area	E	Seven round cement footers measuring 1.5 ft in diameter and approximately 1 ft high. These footers were referred to as possible bridge abutments (NES, Inc. 1996). A rise made of earth and cobbles is situated northeast of the footers (Feature G).
In main feature cluster, central site area	F	A rubble pile, cement troughs, and a cement wall with reinforced rebar. The rubble extends across an area measuring 50 ft x 40 ft.
In main feature cluster, central site area	G	Rise constructed of earth and stone cobbles, possibly used as a foundation for a road or bridge. The dimensions of the feature are approximately 40 ft x 40 ft.

Location on Site	Feature	Feature Description
In main feature cluster, central site area	H (NES, Inc. #5)	A flat raised area of earth with brick and concrete scattered across the ground surface. Some cultural debris was also observed. The dimensions are approximately 80 ft x 60 ft. A stucco-covered brick wall remnant is situated to the northwest of the feature. The wall measured 40 ft in length and 4 ft high, and was oriented east-west. Part of the stucco had deteriorated, exposing a brick interior. Portions of a concrete floor or walkway are visible between the raised area and the wall. Part of a cement wall is also situated directly north of the confluence. It appears to be of the same construction although it does not have a brick interior. The wall measured 32 ft in length and 4 ft in height.
Northeast of main feature cluster	I (NES, Inc. #7)	Large rubble field (composed of brick, stone and structural debris) spread across a series of rises and a large depression between the old road and the Mad River. Two stone pillars are located to the north/northeast of Feature I which appear to be gate remnants associated with the entrance to the mill. The mill race is situated towards the river and is depicted on the 1874 <i>Greene County Atlas</i> .
Due southwest of the main feature cluster	J	Feature J consists of a depression visible on the ground surface.
Southwest of main feature cluster, adjacent to old road bed	K (NES, Inc. #8)	Feature K consists of two depressions with cut stone foundation remnants visible within the depressions. The feature is located towards the southwestern end of the site.
Near boundary of the Metro Park	L	Feature L is a rubble pile/fence line located at the southwestern end of the site. A cement pylon located nearby may be associated with the structure.
West of Feature I	M	Feature M is a cut stone platform probably associated with the town of Kneisly, west of the former Valley Road.

As a result of the October 2003 preliminary reconnaissance, it appeared essential to determine which structural remnants were associated with Kneisly Village and which were not. In order to resolve this issue, detailed mapping of the site was undertaken with a submeter accurate GPS unit. Permanent features of the landscape, both man-made and natural, were mapped using a Trimble TDS1 Global Positioning Satellite (GPS) with a Pro XRS receiver that is capable of sub-meter accuracy in the field.

Supplemental to the GPS mapping and data collection conducted on the site was a limited program of opportunistic shovel testing by 50 cm diameter units, which are referred to as "TU" in the project mapping. These test units focused upon identifying potential features or buried historic landsurfaces, rather than augmenting the existing Phase I artifact collection at the Ohio Historical Society. Shovel tests were situated in close proximity to extant structural remnants.

BHE returned to site 33Gr1023 in February of 2004. The features identified during the 1996 Site Detection survey were mapped with the Trimble GPS unit. One immediate result of this survey and mapping work was an increase in the number of surface features identified. The original NES, Inc. report listed eight features, all the remnants of structures or walls. Feature numbers used by NES, Inc. are included in the table below, except where the feature descriptions did not clearly correlate or did not appear to be identified. The 2003 Phase II investigation identified 13 historic period features spread out over an area of 2000 ft x 375 ft. Thus, the original 5.2 acre area of 33Gr1023 was expanded to over 17 acres. This figure of 17 acres should probably be viewed conservatively, as the majority of the mapped structural remnants are located on the floodplain and the historic period mapping clearly shows that Kneisly extends to the foot slopes west of the former Valley Turnpike.

Features A, B, C, D, and E, located to the south of the small creek draining into the Mad River and east of the former Valley Turnpike, appeared to be contemporaneous. This assertion is based upon the cement construction material and the industrial design. The artifacts visible on the surface included plain ironstone and whiteware, flow blue and transferware, clear glass with screwtops, a mixture of wire and cut nails indicating a nineteenth to twentieth century origin for the occupational debris.

It is unclear what time period Features F and G date to, or what their association with the other structural remnants is. They may be related to Feature H, the Simms house as depicted on the 1896 Greene County Atlas. NES, Inc. (1996: 3-12) also believed that the Feature H (Feature 5 and associated Features 1-4) was the probable location of the Simms house.

If NES, Inc. and BHE are correct in considering the Simms mansion to be the Feature 5/Feature H structural remnants, then the building appears to have origins that are earlier than the Simms family ownership of the property. This may support the assertion that this home was a modified version of the former Kneisly residence on Mad River. Indeed a single structure is illustrated in this area on the 1855 map within property owned by "J. Kneisly."

Feature I is thought to be the mill depicted on the 1855, 1874, and 1896 maps described previously. NES, Inc. (1996:3-12) supports this conclusion stating that the large mill building photographed from a Wright Brother's airplane, "correlates with Feature 7 on the [1996 NES] Kneisly site map."

Feature M, a cut stone platform situated to the northeast of the juncture of Lower Valley Road and Union Road, is considered to be a part of 33Gr1023 based on the location of structures located within Kneisly Village on the 1855 map. Specifically, this map indicates that the mid-nineteenth century properties at this location, to the west of the turnpike, belonged to a "J. Kneisly."

If NES, Inc. and BHE are correct in considering the Simms mansion to be the Feature 5/Feature H structural remnants, then the building appears to have origins that are earlier than the Simms family ownership of the property. This may support the assertion that this home was a modified version of the former Kneisly residence on Mad River. Indeed a single structure is illustrated in this area on the 1855 map within property owned by "J. Kneisly."

Lower Valley Road, the former Valley Turnpike, now ends where it intersects with Union Road. While Union Road has been truncated at its eastern extent, and the covered bridge crossing the Mad River has

been removed, remnants of the former turnpike continue past this point. A trailer park that is no longer standing was situated to the east of the old Lower Valley Road and north of Union Road. Demolition debris from the trailer park, as well as other possible historic structural remnants associated with the turnpike, probably comprise the artifacts scattered across the ground surface in this area. The northern boundary of site 33Gr1023 is unclear, although based upon the historic mapping Kneisly Village probably did not extend beyond the road leading to Harmony. A foundation situated at the northern end of BHE's map, may be a part of the cluster of historic properties shown on the 1855 map at the "T-junction," of the Valley Turnpike and the road leading up to Harmony to the west.

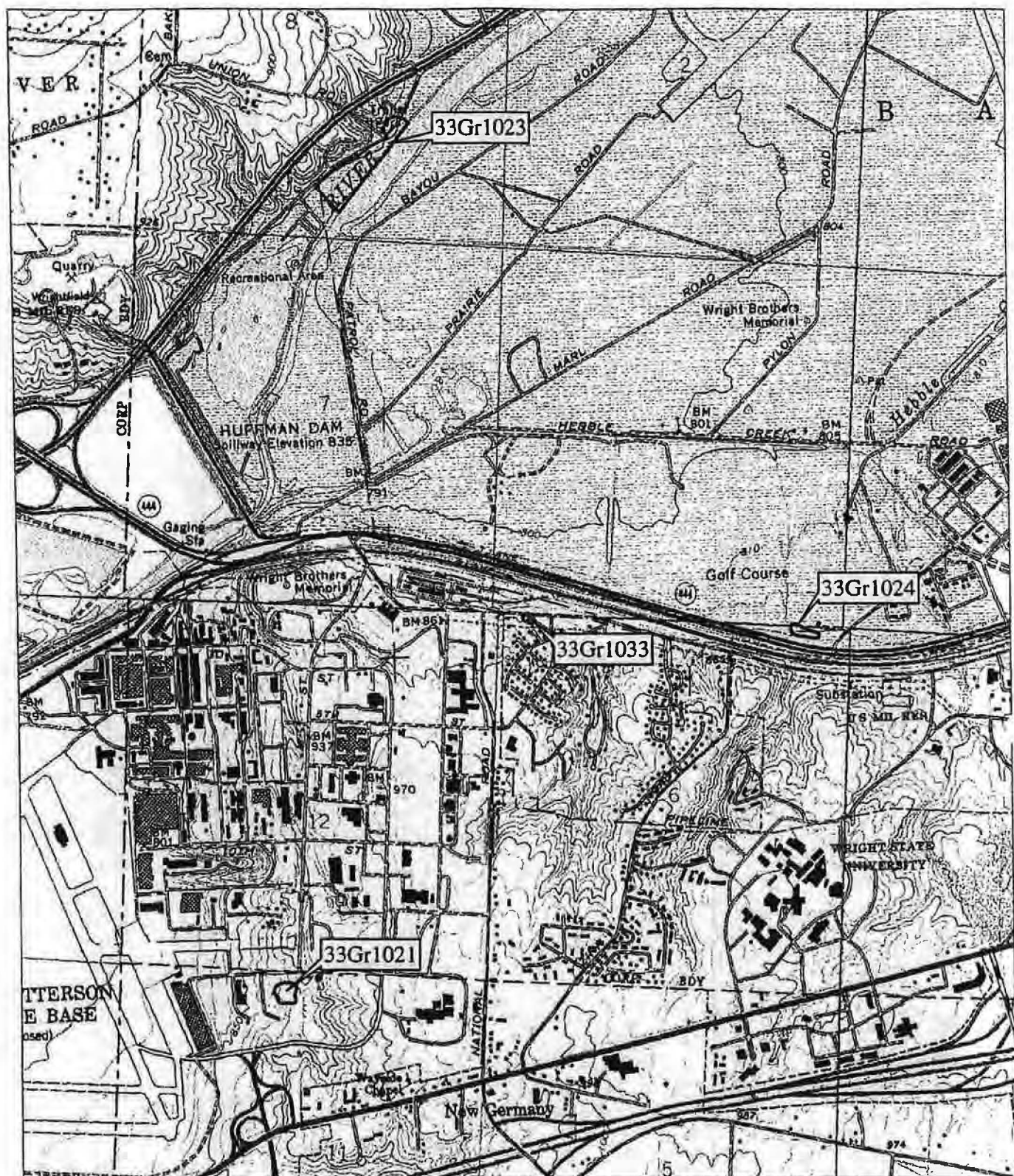
Along with the mapping efforts, additional limited shovel testing was directed at ascertaining the presence of buried features or historic landsurfaces at 33Gr1023. Although 50 cm diameter shovel tests were excavated at the site, these were primarily directed at determining whether buried historic landsurface or features could be detected in areas adjacent to the structural remnants. Thus, artifacts were identified and correlated with the appropriate soil horizons in the field and not collected. In addition, none of the shovel test units resulted in the recovery of temporally diagnostic artifacts; diagnostic artifacts were the only items to be collected during field investigation per the Scope of Work.

Cultural material observed in the shovel tests was confined to the upper 50 cm of deposits, specifically Stratum 1 and Stratum 2a and consisted largely of Architectural debris, bricks, mortar, and nails. Artifacts observed on the surface were similar to those reported by NES, Inc. and consisted of Kitchen Class plain ironstone, blue transferware, aqua and clear glass shards, as well as Architectural Class handmade and perforated bricks. In general, the intact bottles identified were modern alcohol refuse or examples with screw tops. The impression gained from observations of the surface artifact scatter was a nineteenth to twentieth century assemblage, as suggested by the NES, Inc. Phase I results. This may be a reflection of the historic use evidenced at the site that was continuous from the early 1800s until the town was abandoned in the early twentieth century.



Testing at Site 33Gr1023.

	<p>Feet</p> <p>125 0 125 250</p>	<p>July 7, 2004</p>	
	<p>Project No. 1014.010</p>	<p>Base Map: Portion of a USGS DOQQ for Fairborn, OH (2000)</p>	



Locations of Sites 33Gr1023, 33Gr1021, 33Gr1033, and 33Gr1024 on a USGS 7.5 Minute Topographic Quadrangle.

	<p>Feet</p> <p>1000 0 1000 2000</p>	<p>November 8, 2004</p>	
	<p>Project No. 1014.010</p>	<p>Base Map: USGS 7.5' Topographic Map - Fairborn, OH</p>	

- *2. Discuss the relationship between the site and other known sites in the area in terms of location, physical characteristics, size, etc.

J. Continuation Section: Specify Section & Item (use additional Continuation Sheet(s) if necessary)

contin. from Section F, # 23
 artifact assemblage and a probable buried
 historic land surface; and preservation of
 numerous discrete surface features including
 structural foundations dumps an old
 roadway and former fence lines.

***K. Sketch Map or Copy of Project Map of Site**

Include north arrow and scale. Attach a Xeroxed section of the appropriate U.S.G.S. quadrangle on a separate sheet. Outline total area surveyed and include locations of all identified sites on the Xerox of the quadrangle.

SEE ATTACHED SHEET

*Site Location		Direction/Bearing from Site to
Permanent Feature	Distance (m)	Terrain Feature
<u>SOUTH - NORTHEAST</u>	<u> </u>	<u>CONFLUENCE OF CREEK AND MAD RIVER</u>
<u>NORTHWEST</u>	<u> </u>	<u>LOWER VALLEY ROAD</u>
<u> </u>	<u> </u>	<u> </u>



OHIO ARCHAEOLOGICAL INVENTORY

for official use only

*Response required for acceptance of form

Coder _____
Date _____

A. Identification

*1. Type of Form (select as many as appropriate):

☒ New Form _____ Revised Form _____ Transcribed Data _____2. County Greene *3. Trinomial State Site Number 33 - GR - 918

4. Site Name(s) _____

5. Project Site Number 940066.2

6. Other State Site Number _____

7. Source (of item A.5. and/or A.6.) Field Notes on Archaeological Investigations at Wright-Patterson Air Force Base, on file at Great Lakes Archaeological Research Center, Milwaukee, WI

B. Location

*1. UTM Zone X 16 or 17Easting 7 5 0 5 8 0
Northing 4 4 1 0 5 8 02. Latitude 39° 48' 19"Longitude 84° 04' 22"*3. Township 2 Range 8 Not Applicable _____Section 1 ¼ Section: _____ SW _____ SE X NW _____ NETownship Name Bath Township*4. Quadrangle Name Fairborn, Ohio*5. Quadrangle Date 1992*6. Confident of Site Location X Yes _____ No _____

C. Ownership

*1. Name(s) Wright-Patterson Air Force Base

Address _____

City/Town, State, Zip Dayton, OhioPhone (513) 257-5535

2. Tenant (if any) _____

Address _____

City/Town, State, Zip _____

Phone () _____

*3. Ownership Status (select only one, as appropriate):

_____ Private (single)

_____ Private (multiple)

_____ Local Govt.

_____ State Govt.

X Federal Govt.

_____ Multiple Govt.

_____ Mixed-Govt./Private

_____ Unknown

D. Temporal Affiliations

*1. Affiliations Present (select only one, as appropriate):

X Prehistoric

_____ Historic

_____ Prehistoric and Historic

_____ Unknown

_____ Unrecorded

*Site No. 33 -
Plotted ☐

~~for other use only~~**Prehistoric**

- *2. Prehistoric Temporal Period (s) Represented (select as many as appropriate):

☒ Unassigned Prehistoric ☐ PaleoindianArchaic: ☐ Unassigned ☐ Early ☐ Middle ☐ LateWoodland: ☐ Unassigned ☐ Early ☐ Middle ☐ Late☐ Late Prehistoric ☐ Protohistoric ☐ Other (specify) _____

- *3. Minimum Number of Prehistoric Temporal Periods Represented
- 1

- *4. Basis for Assignment of Prehistoric Temporal Period (s) (select as many as appropriate):

☐ Diagnostic Artifacts ☐ Diagnostic Features ☐ Radiometric☒ Unrecorded ☐ Other (specify) _____

5. Prehistoric Cultural Component (s) Represented (see manual):

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

6. Describe how Prehistoric Temporal Period (s) and Cultural Component (s) were determined (list diagnostic artifacts and/or features; include type names, attach photographs and/or illustrations, and identify researcher). When listing artifacts and/or features please specify Prehistoric Cultural Component (s) by using letter designations from Item D.5.

Researcher _____

- *7. Categories of Prehistoric Materials Present at Site (select as many as appropriate):

☒ Lithics ☐ Ceramics ☐ Metal ☐ Faunal Remains ☐ Floral Remains☐ Human Skeletal Remains ☐ Unrecorded ☐ Other (specify) _____

8. Specific Prehistoric Cultural Materials Collected:

Type	Count	Type	Count
chert flakes	66		

Historic

- *9. Affiliation Present (select only one, as appropriate):

☐ Aboriginal ☐ Non-Aboriginal ☐ Both ☐ Undetermined

- *10. Historic Temporal Period (s) Represented (select as many as appropriate):

a. ☐ Pre-1795b. ☐ 1796-1829c. ☐ 1830-1849d. ☐ 1850-1879e. ☐ 1880-1899f. ☐ 1900-1929g. ☐ 1930-1949h. ☐ 1950-1974i. ☐ 1975-2000j. ☐ Historick. ☐ 18th Centuryl. ☐ 19th Centurym. ☐ 20th Centuryn. ☐ Historic Aboriginal

~~to other sheets only~~

*11 Minimum Number of Historic Temporal Periods Represented _____

*12. Basis for Assignment of Historic Temporal Period (s) (select as many as appropriate):

☐ Diagnostic Artifacts ☐ Diagnostic Architectural Remains
☐ Diagnostic Features ☐ Documentary Evidence ☐ Oral Tradition
☐ Unrecorded ☐ Other (specify) _____

13. Describe how Historic Temporal Period (s) were determined (list any diagnostic architectural remains, diagnostic artifacts and/or features; include type names, attach photographs and/or illustrations, and identify researcher). When listing artifacts and/or features specify Historic Temporal Period (s) by using letter designations from Item D.10.

Researcher _____

*14. Functional Categories of Historic Materials Present at Site (select as many as appropriate):

☐ Kitchen ☐ Furniture ☐ Personal
☐ Toys & Games ☐ Printed Matter ☐ Religious/Ceremonial
☐ Military ☐ Weapons ☐ Transportation
☐ Architectural ☐ Misc. Hardware ☐ Const./Manufacturing Tools
☐ Agricultural ☐ Fuel/Energy ☐ Food Remains
☐ Clothing ☐ Unrecorded ☐ Unknown
☐ Other (specify) _____

15. Specific Historic Cultural Materials Collected:

Type	Count	Type	Count
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

General

16. Describe Prehistoric and/or Historic Cultural Materials observed but not collected. State reason (s) for not collecting.

All cultural material that was encountered was recovered.

Affiliated Ohio Historic Inventory Site Number and Name :

~~for official use only~~**E. Physical Description**

*1. Archaeological Setting (select only one, as appropriate):

☐ Rockshelter/Cave ☒ Open ☐ Unrecorded ☐ Unknown
☐ Submerged ☐ Other (specify) _____

*2. Prehistoric Site Type (select as many as appropriate):

Habitation: ☒ Camp ☐ Village ☐ Hamlet ☐ Unspecified Habitation

Extractive: ☐ Quarry ☒ Workshop

Ceremonial: ☐ Unspecified Mound ☐ Earth Mound ☐ Stone Mound
☐ Effigy Mound ☐ Mound Group ☐ Hilltop Enclosure
☐ Geometrical Earthwork ☐ Cemetery ☐ Isolated Burial (s)
☐ Petroglyph/Pictograph

Other: ☐ Unknown ☐ Unrecorded ☐ Other (specify) _____

*3. Historic Site Type (select as many as appropriate):

☐ Residential ☐ Commercial ☐ Social ☐ Government
☐ Religious ☐ Educational ☐ Mortuary ☐ Recreation
☐ Subsistence ☐ Industrial ☐ Health Care ☐ Military
☐ Transportation ☐ Unrecorded ☒ Unknown
☐ Other (specify) _____

*4. State the bases on which site type assignment (s) were made.

Site determination was based on the geomorphic setting, the distribution of positive shovel probes and the quantity and types of artifacts that were recovered.

*5. Site Condition (select only one, as appropriate):

☐ Undisturbed ☒ Disturbed - Extent Unknown ☐ Fully disturbed
☐ Destroyed ☐ Unrecorded ☐ Unknown

*6. Dominant Agent (s) of Disturbance (select as many as appropriate):

☐ None Apparent ☒ Agriculture ☐ Historic Construction ☐ Water
☐ Transportation ☐ Archaeological Excavation ☐ Mining ☐ Vandalism
☐ Unrecorded ☐ Other (specify) _____

*7. Nature of Disturbance/Destruction:

Cultivation

*8. Current Dominant Land Use (see manual):

Herbaceous rangeland

*9. Land Use History:

This area has been impacted by agricultural practices during pre-WPAFB times. During the 1940s, 1960s portions of the area were used for chemical warfare testing and other WPAFB-related activities. Currently, the land is being utilized for a hunting preserve for WPAFB personnel.

*10. Site Elevation 243.1 Meters A.M.S.L. (elevation to be taken from UTM point)

*11. Physiographic Setting of Site (select only one, as appropriate):

☐ Lake Plain ☐ Lexington Peneplain ☐ Unglaciaded Plateau
☒ Till Plain ☐ Glaciaded Plateau ☐ Unrecorded

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*12. Glacial Geomorphology (select only one, as appropriate):

- ☐ Not Applicable ☐ Wisconsin End/Lateral Moraine
☐ Kansan Ground Moraine ☐ Wisconsin Kame/Kettle/Esker/Drumlin
☐ Illinoian Ground Moraine ☐ Wisconsin Lacustrine Deposit
☐ Illinoian Outwash ☐ Post Wisconsin Lacustrine Deposit
☐ Wisconsin Ground Moraine ☒ Wisconsin Outwash
☐ Unrecorded ☐ Other (specify) _____

*13. Regional Geomorphological Setting (select only one, as appropriate):

- ☒ Stream Valley ☐ Upland Hill Slope ☐ Beach Ridge
☐ Hill or Ridge Top ☐ Lake Plains Interfluvial Zone ☐ Unrecorded

*14. Local Environmental Setting (select only one, as appropriate):

- Terrace: ☒ Unknown ☐ T-1 ☐ T-2 ☐ T-3 ☐ T-4
☐ Beach Ridge ☐ Terrace Remnant ☐ Natural Levee ☐ Floodplain
☐ Low Rise on Floodplain ☐ Alluvium ☐ Island ☐ Kame ☐ Drumlin
☐ Esker ☐ Moraine ☐ Glacial Hummock ☐ Wetland Hummock
☐ Bluff ☐ Bluff Base ☐ Bluff Edge ☐ Saddle ☐ Hill or Ridge Top
☐ Closed Depression ☐ Unrecorded ☐ Other (specify) _____

*15. Soils:

Soil Association Linwood Muck
 Soil Series-Phase/Complex Linwood Series
 Reference Garner, D.E., and A. Ritchie. 1978. Soil Survey of Greene County, Ohio. U.S. Department of Agriculture, page 68

*16. Down Slope Direction (select only one, as appropriate):

- ☒ N ☐ NW ☐ NE ☐ E ☐ All ☐ Flat
☐ S ☐ SW ☐ SE ☐ W ☐ Unrecorded

*17. Slope Gradient (percent) 0-2% ☐ Unrecorded

*18. Drainage System (see manual):

Major Drainage Great Miami River
 Minor Drainage Mad River

*19. Closest Water Source (select only one, as appropriate):

Name: Trout Creek
☐ Permanent Stream ☐ Lake/Pond ☐ Ephemeral Stream
☐ Permanent Spring ☐ Swamp/Bog ☐ Intermittent Spring/Seep
☐ Slough/Oxbow Lake ☐ Artificial Lake/Pond (historic sites only)
☐ Artificial Stream/Ditch (historic sites only) ☐ Unrecorded
☒ Other (specify) channelized stream

*20. Horizontal Distance to Closest Water Source 270 (meters from UTM point)

*21. Elevation Above Closest Water Source _____ (meters A.M.S.L. from UTM point)

F. Reporting Information

*1. Investigation Type (select as many as appropriate):

- ☐ Reported ☐ Examination of Collection ☐ Surface Collection
☐ Auger/Soil Corer ☐ Shovel Test (s) ☒ Test Pit (s) ☐ Test Trench (es)
☐ Deep Test (s) ☐ PZ or Humus Removal ☐ Testing/Excav. (strategy unknown)
☐ Mitigation/Block Excavation ☐ Aerial Photograph
☐ Remote Sensing (specify) _____
☐ Chemical Analysis (specify) _____
☐ Unrecorded ☒ Other (specify) Geomorphic soil test pits

~~for official use only~~

*2. Surface Collection Strategy (select as many as appropriate):

☒ Not Applicable ☐ Grab Sample ☐ Diagnostics
☐ Controlled-Unknown ☐ Controlled-Total
☐ Controlled-Sample ☐ Unrecorded
☐ Other (specify) _____

3. If surface collection strategy is Controlled-Total, Controlled-Sample, or Other, describe methodology and percentage.

4. Surface Visibility (select only one, as appropriate):

☐ None ☐ Less than 10% ☐ 11-50%
☐ 51-90% ☐ 91-100% ☐ Unrecorded

5. Describe surface conditions.

*6. Site Area (square meters) 3600

Unrecorded _____

*7. Basis for Site Area Estimate (select only one, as appropriate):

☐ Guessed ☐ Historic Maps ☐ Aerial Photograph ☐ Paced
☒ Taped ☐ Transit/Alidade ☐ Range Finder ☐ Unrecorded
☐ Other (specify) _____

*8. Confidence of Site Boundaries: ☐ No ☒ Yes ☐ Unrecorded9. Estimated Percentage of Site Excavated ☐ Unrecorded ☐ Unknown ☒*10. Name of Form Preparer Andrew Jalbert/Jennifer Haas*11. Institution Great Lakes Archaeological Research Center, Inc.*12. Date of Form (year/month) September 1995*13. Field Date (year/month) October 199414. Time Spent at Site 2 days15. Weather Conditions 65° partly cloudy

16. Name (s), Address (es), Phone Number (s) of Local Informants

*17. Artifact Repository (ies) Great Lakes Archaeological Research Center, Inc.
Milwaukee, WI 53202

18. Name (s), Address (es), Phone Number (s) of Owners of Collections From Site (attach inventories of private collections).

~~for official use only~~

19. Photographs (select as many as appropriate):

No. of Slides _____ No. of Prints 7

Aerials: _____ Black/White _____ Color _____ Infrared

X None

20. Name and Address of Institution Where Photos Are Filed (include photo log number if available)

88 ABW/EME, 5490 Pearson Road, Wright-Patterson Air Force Base, Ohio

Roll 7; frames 9 - 15

*21. National Register Status (select only one, as appropriate):

_____ National Register Property†

_____ Determined Eligible for National Register†

X National Register Status Not Assessed

_____ Removed from National Register†

_____ Determined Not Eligible†

†Determination made by Keeper of the National Register (date) _____

22. State Registry Status (select only one, as appropriate):

_____ State Registry Listed†

X Not Assessed for State Registry

_____ Removed from State Registry†

_____ Determined Not Eligible†

†Determination made by Ohio Historical Society (date) _____

Discuss the potential significance of the site (does it meet National Register and/or State Registry criteria of significance in your opinion? Why or why not? Upon what evidence have you based your opinion?)

Site 33GR918 is potentially eligible under National Register of Historic Places criteria D. That is, site 33GR918 may yield information important to prehistory as evidenced by the recovery of 66 pieces of chert chipped flaking debris from a relatively undisturbed context. Further testing is necessary at site 33GR918 to fully determine the eligibility of site 33GR918 for listing on the National Register of Historic Places.

Special Status (select only one, as appropriate):

_____ None

_____ Wilderness Area

_____ Wildlife Preserve

_____ Park

_____ Scenic River

_____ Nature Preserve

_____ Forest

X Military Installation

_____ Archaeological Preserve

_____ Archaeological District

_____ Unknown

_____ Other (specify) _____

~~for official use only~~*** G. References - List Primary Documentary References (see manual):**

1. Haas, Jennifer R. and John D. Richards
1995 Summary Report of Archaeological Sites in the Great Wright-Patterson Air
Force Base Project Area. Great Lakes Archaeological Research Center, Inc. Technical Memo
95.007.
2. Haas, Jennifer R. and John D. Richards
1995 Summary Report of Archaeological Investigations at Wright-Patterson Air
Force Base, Ohio. Great Lakes Archaeological Research Center, Inc. Technical Memo 95.011.
3. Richards, John D., Jennifer R Haas, Justin Harvey, and Michael Kolb
1995 Archaeology, Geomorphology, and Land Use History at Wright-Patterson Air
Force Base, Ohio. Great Lakes Archaeological Research Center, Inc. Reports of Investigations
No. 389.

H. Radiometric Dates

1. Materials (s) Dated _____
 Date (uncorrected C14 years) _____
 Laboratory _____
 Sample # _____
 Reference (s) _____
2. Materials (s) Dated _____
 Date (uncorrected C14 years) _____
 Laboratory _____
 Sample # _____
 Reference (s) _____
3. Additional Radiometric Dates Yes _____ No _____
 (use Continuation Section to list other dates)

I. Description of Site

- * 1. State physical description of the site and its setting, including dimensions, features (with measurements), nature and location of artifacts and concentrations, extent and location of disturbances, etc.

Site 33GR918 is located on the edge of a low meltwater stream terrace. Soils consist of a silt loam Ap horizon, a sandy loam E horizon, and a silty clay Bt horizon. The relatively shallow Ap horizon (0-25 cmbs) suggests that intact subsurface features may be present within the site boundaries. A total of 11 positive shovel probes were recovered in a 3600 meter square area. Artifacts recovered include 66 pieces of chert chipped stone flaking debris.

- *2. Discuss the relationship between the site and other known sites in the area in terms of location, physical characteristics, size, etc.

Site 33GR918 is located in relative proximity to newly identified sites 33GR917, 33GR919, and 33GR920 (see section K). However, the relationship between site 33GR918 and these sites is unknown at this time; further archaeological investigations are necessary.

J. Continuation Section: Specify Section & Item (use additional Continuation Sheet (s) if necessary)

Section B:

Ohio State Grid Coordinates were provided by Don Smith (WPAFB Civil Engineering) and are as follows:

Easting 1558134.653

Northing 661366.112

Latitude and Longitude were also provided by Don Smith (WPAFB Civil Engineering) and are as follows:

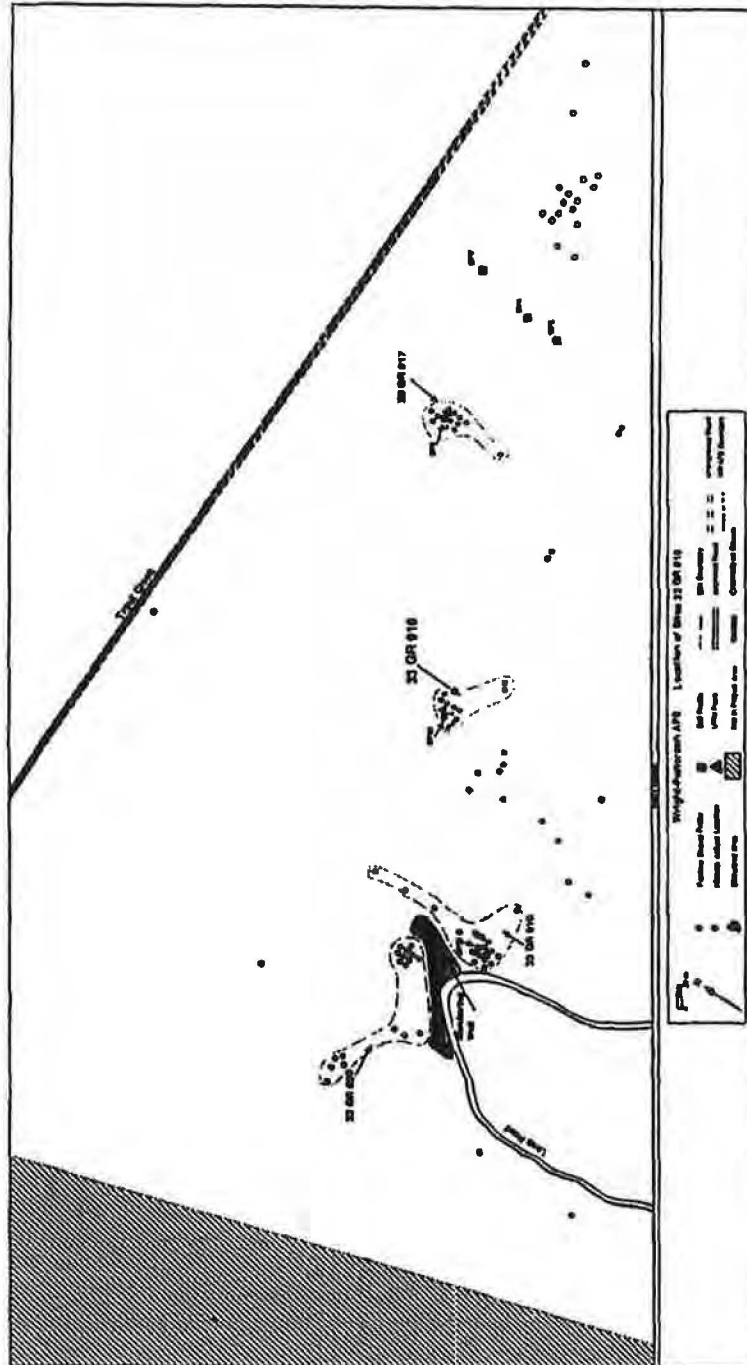
B2.

N Lat 39-48-16.17814

WLong 84-04-31.94205

***K. Sketch Map or Copy of Project Map of Site**

Include north arrow and scale. Attach a Xeroxed section of the appropriate U.S.G.S. quadrangle on a separate sheet. Outline total area surveyed and include locations of all identified sites on the Xerox of the quadrangle.



*Site Location

Permanent Feature
Monitoring Well

Distance (m)
7686 m

Direction/Bearing from Site to
Terrain Feature

Prairie Rd/Symmes Rd

7320 m

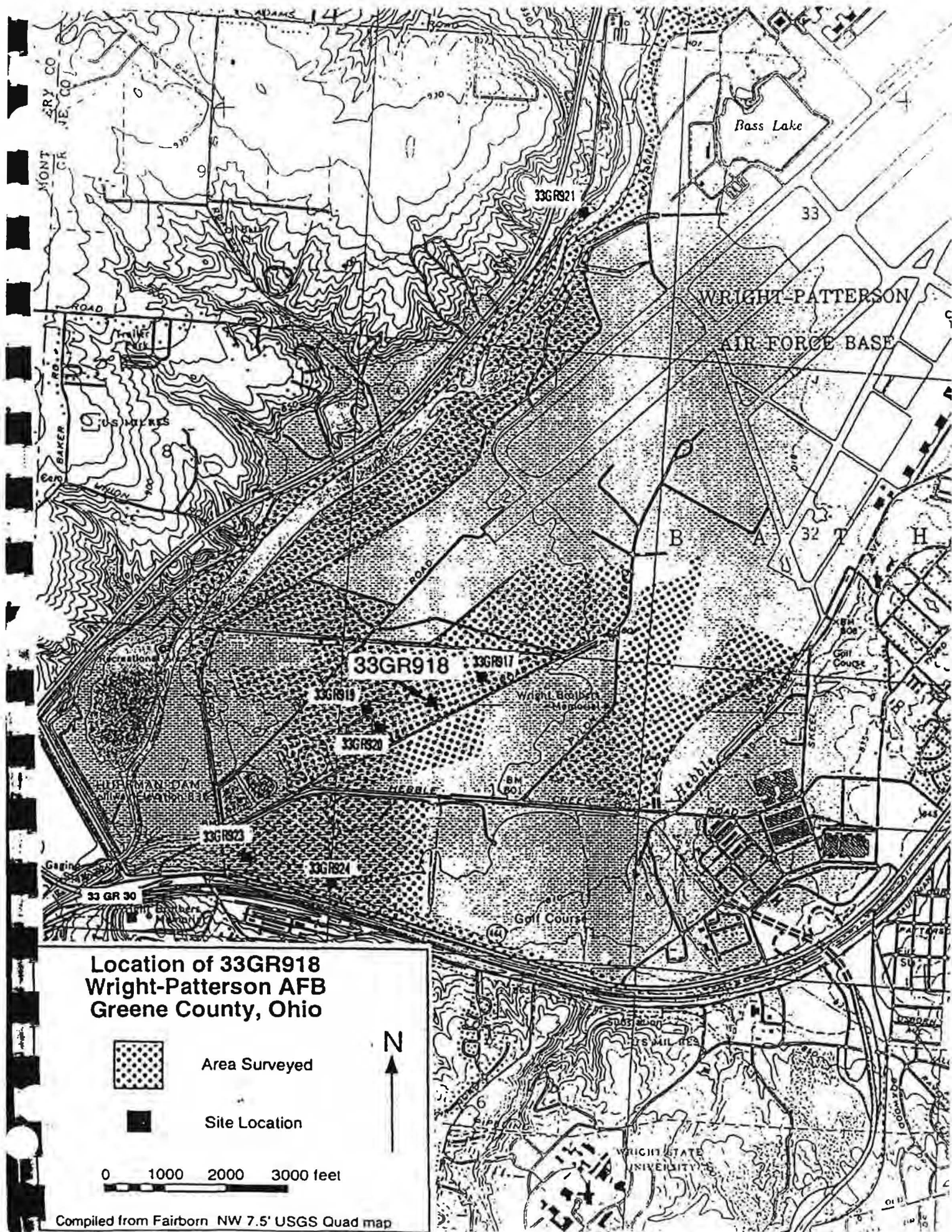
South 54° West

Marl Rd/Pylon Rd

8784 m

North 54° West

North 66° East



6/22/2009

SHPO Response



June 22, 2009

Received
14 Jul 09

Jan Ferguson
Chief, Operations Branch
Environmental Management Division
88 ABW/CEVO
1450 Littrell Road
Wright-Patterson Air Force Base, Ohio 45433-5209

Dear Ms. Ferguson:

Re: Construction of an Explosive Ordnance Disposal proficiency training and emergency disposal range at Wright-Patterson Air Force Base, Ohio

This is in response to correspondence dated April 3, 2009 (received on April 6, 2009). My comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, and the associated regulations at 36 CFR Part 800.

In a letter dated October 24, 2008, you requested that the Ohio Historic Preservation Office (OHPO) concur with your finding that the proposed construction of an Explosive Ordnance Disposal (EOD) proficiency training and emergency disposal range at any of three possible locations at Wright-Patterson Air Force Base, Ohio will have no adverse effect on historic properties. The possible locations were given as (1) the former EOD range in Area C, (2) property north of Hebble Creed Road and west of the Huffman Prairie Flying Field in Area C, and (3) the Sandhill site in Area C. A fourth possible site (4) on Skeel Avenue in Area C has since been added. Training at the proposed EOD facility, which will involve the detonation of explosive devices, will occur an average of three days per week for up to eight hours per day. The maximum number of detonations that will occur in a training day is one per hour, or a total of eight.

In a response dated January 20, 2009, OHPO requested additional information regarding the proposed project, specifically an explanation of how Wright-Patterson Air Force Base (WPAFB) had delineated the Area of Potential Effects for this project. We expressed concern that WPAFB's initial analysis did not seem to consider indirect effects that operation of the EOD facility may have on historic properties.

WPAFB's April 3, 2009 correspondence conveys additional analysis of effects that are likely to result from the project, including noise sound waves and projected sound (decibel) levels. WPAFB has delineated an Area of Potential Effect for each potential site that accounts for both direct and indirect effects. Department of Defense software was used to perform a blast analysis that served as the basis for a 100-foot radius for direct effects. A noise manual published by the Naval Surface Weapons Laboratory, Virginia was used to establish radii of 1250-feet and 3000-feet for indirect, atmospheric effects.

Table 3.9-2 in the Environmental Assessment for this project shows that the noise manual referenced above suggests that 5-lb explosive sources, the same size device that will be detonated at this facility, will have an unweighted peak noise level of 129 decibels [A-Weighted noise level of 83 decibels] at 3,000 feet away from the detonation point. At 1250 feet, the unweighted peak noise level will be 136 decibels [A-Weighted noise level of 99 decibels].

OHIO HISTORICAL SOCIETY

Ohio Historic Preservation Office

1982 Velma Avenue, Columbus, Ohio 43211-2497 ph: 614.298.2000 fx: 614.298.2037
www.ohiohistory.org

Former EOD Range Site (1)

Based on the information and analysis provided in your submissions, it is our opinion that construction and operation of the proposed EOD facility at the former EOD range north of the intersection of Riverview and Symmes Road will not affect historic properties. While archaeological site 33GR1023 is located approximately 900 feet west of the proposed point of detonation and will be subject to an unweighted peak noise level of more than 136 decibels [A-Weighted noise level of more than 99 decibels], it is our opinion that this noise does not constitute an alteration to the characteristics of the archaeological site that qualify it for listing in the National Register of Historic Places (NRHP).

Hebble Creek Site (2)

It is our opinion that construction and operation of the proposed EOD facility at the Hebble Creek site will adversely affect Huffman Prairie Flying Field (HPFF), a National Historic Landmark. Portions of Huffman Prairie Flying Field are within the 1250-foot radius where an unweighted peak noise level of 136 decibels [A-weighted noise level of 99 decibels] will be experienced. Virtually all of Huffman Prairie Flying Field is within the 3000-foot radius where an unweighted peak noise level of 129 decibels [A-weighted noise level of 83 decibels] will be heard.

Your April 3, 2009 letter acknowledges that the Hebble Creek "site primarily has a moderate potential of causing increased complaints from visitors of the flying field", but contends that such complaints would be "subjective, based on the visitor's perception and understanding of HPFF being located on an active military installation".

While we appreciate the basis of your concern that "it is difficult for (WPAFB) to make an assessment of the impact (of the proposed project) to the historic integrity of the HPFF solely based upon visitor experience when the law addresses the effects on historic properties", we note that 36 CFR Section 800.5(a)(2)(v) explicitly states that "Introduction of visual, atmospheric or audible elements that diminish the property's significant historic features" constitutes an adverse effect on historic properties. It is our opinion that the setting and feeling of Huffman Prairie Flying Field are the most important aspects of its integrity due to the nature of the events from which it derives its historic significance. The Wright Brothers' experiments in flight took place in pasture land with defining characteristics that included tranquility and isolation. Certainly the presence of WPAFB cannot be ignored when assessing the current setting and feeling of Huffman Prairie Flying Field, but it is our opinion that daily operations at the base have not compromised the historic property's setting and feeling to the extent that they are no longer critical components of Huffman Prairie Flying Field's integrity. Construction and operation of the proposed EOD facility at the Hebble Creek site will lead to further degradation of these qualities.

Also, considering the emphasis that 36 CFR Part 800 places on engaging consulting parties, it bears mentioning that WPAFB and the National Park Service (NPS) worked closely over the past decade to prepare a Cultural Landscape Report for Huffman Prairie Flying Field that concluded that removal of the existing Rod and Gun Club and the Combat Arms Training Maintenance (CATM) facility that previously occupied the Hebble Creek site would "reestablish the pastoral character (of Huffman Prairie Flying Field) and allow for a more reflective atmosphere for visitors". In a letter to WPAFB dated November 7, 2008 expressing concern about construction of the proposed EOD facility at the Hebble Creek site, the NPS states that placing the facility here would result in "conditions diametrically contrary to the plans of the NPS and the Air Force to...(enhance) the visitor experience." The NPS reports that annual surveys of visitors to Huffman Prairie Flying Field "consistently cite noise and activity from the Rod and Gun Club and

the (now removed) CATM facility" as a distraction that detracts from the visitor experience. Such comments underscore the importance of the historic property's setting in promoting appreciation of its significance.

We concur with your statement that "the potential risk for disturbing the visitor experience would be reduced" through the implementation of "appropriate notifications and awareness education of the EOD range operations to the HPFF visitors". However, it is our opinion that these efforts would amount to attempts to minimize the adverse effect, not avoid it.

With respect to archaeological resources, it is our opinion that noise resulting from operation of the proposed EOD facility at the Hebble Creek site will not constitute an alteration to the characteristics of archaeological site 33GR918 that qualify it for listing in the NRHP

Sidehill Site (3)

Construction and operation of the proposed EOD facility at the Sandhill site will not affect historic properties. There are no properties within the APE for this location that are eligible for listing in the NRHP.

Skeel Avenue Site (4)

It is our opinion that construction and operation of the proposed EOD facility at the Skeel Avenue site will have an adverse effect on historic properties. Portions of Huffman Prairie Flying Field and the Brick Quarters Historic District, which has been determined to be eligible for listing in the NRHP, are within the 3000-foot radius where an unweighted peak noise level of 129 decibels [A-weighted noise level of 83 decibels] will be heard. Your April 3, 2009 letter states that "(b)ased upon the blast analysis there would be no structural impacts to any historic building, nor should there be any building rattle disturbance to residents living inside the Brick Quarters". However, in the same letter you acknowledge that "there is a low to moderate risk of receiving complaints from (visitors to Huffman Prairie Flying Field regarding) the detonations based upon the noise prediction guidelines established by the Naval Weapons Service Center...(and) a low to moderate risk of receiving complaints from residents living in the Brick Quarters Historic District as a result of noise produced from the detonations." As stated above, it is our opinion that noise at an unweighted peak noise level of 129 [A-weighted noise level of 83 decibels] within Huffman Prairie Flying Field will significantly compromise the most important aspects of its historic integrity – its setting and feeling. Furthermore, while we acknowledge that sound at this level may be less than noise associated with operations at WPAFB that has been part of the residential development's setting since its construction, we feel that broader discussion involving consulting parties – most notably residents of the Brick Quarters – is needed to properly assess the effects of construction and operation of the proposed EOD facility at the Skeel Avenue site on the Brick Quarters Historic District.

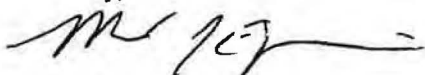
Should WPAFB choose to construct the proposed EOD facility at either the site of the former EOD range or the Sandhill site, no further coordination with this office will be necessary unless there is a change in the project. Should either the Hebble Creek site or the Skeel Avenue site be selected, we encourage WPAFB to continue consultation with OHPO, the National Aviation Heritage Area, National Park Service staff at Dayton Aviation National Heritage Area, and National Park Service staff at the Midwest regional office in Omaha, Nebraska (representing the Secretary of the Interior).

Jan Ferguson
June 18, 2009
Page Four

Regardless of which alternative is pursued, pursuant to 36 CFR Section 800.10(c) WPAFB should notify NPS Midwest regional staff regarding the proposed project because consultation involves Huffman Prairie Flying Field, a National Historic Landmark (NHL). In addition, should either the Hebble Creek site or the Skeel Avenue site be selected for the proposed EOD facility, it is our opinion that WPAFB should invite the NPS Midwest regional staff to participate in consultation because the project may adversely affect an NHL.

If you have any questions, please contact Justin Cook, History Reviews Manager, by phone at (614) 298-2000 or by email at jcook@ohiohistory.org. Thank you for your cooperation.

Sincerely,



Mark J. Epstein, Department Head
Resource Protection and Review

MJE:jc

Copy: Lawrence Blake, Superintendent, Dayton Aviation Heritage National Historical Park,
Post Office Box 9280, Wright Brothers Station, Dayton, Ohio 45409
Mark Chavez, National Park Service, Midwest Regional Office, 601 Riverfront Drive,
Omaha, Nebraska 68102
Anthony F. Sculimbrene, Executive Director, National Aviation Heritage Area,
Post Office Box 414, Wright Brothers Station, Dayton, Ohio 45409

OHPO Serial # 1024585

3/29/2010

MOA

**MEMORANDUM OF AGREEMENT
BETWEEN THE UNITED STATES AIR FORCE AND
THE OHIO STATE HISTORIC PRESERVATION OFFICE
REGARDING
THE PROPOSED EXPLOSIVE ORDNANCE DISPOSAL PROFICIENCY
TRAINING RANGE
AT WRIGHT-PATTERSON AIR FORCE BASE, GREENE COUNTY, OHIO**

WHEREAS, the United States Air Force, Wright-Patterson Air Force Base, Greene County, Ohio (Air Force) plans to construct an explosive ordnance disposal proficiency training range (EOD range) on the installation (undertaking) pursuant to Air Force Instruction 32-3001, *Explosive Ordnance Disposal Program* (AFI 32-3001); and

WHEREAS, the Air Force has defined the undertaking's area of potential effect (APE) as a 3,000-foot radius from the center of the EOD range based upon noise sound waves extending away from the detonation point (refer to Attachment 1 for mapping showing the 3,000 foot radius from the site); and

WHEREAS, the Air Force has determined that the undertaking may have an adverse effect on Huffman Prairie Flying Field, which is a National Historic Landmark and a unit of Dayton Aviation Heritage National Historical Park, and the Brick Quarters Historic District, which is eligible for listing on the National Register of Historic Places, and has consulted with the Ohio State Historic Preservation Office (SHPO) pursuant to 36 C.F.R. part 800, the regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f); and

WHEREAS, the Air Force has consulted with the Dayton Aviation Heritage National Historical Park and with the National Aviation Heritage Alliance regarding the effects of the undertaking on historic properties and has invited them to sign this MOA as concurring parties; and

WHEREAS, in accordance with 36 C.F.R. § 800.6(a)(1), the Air Force has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination with specified documentation and the ACHP has chosen not to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii); and

NOW, THEREFORE, the Air Force and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

III. EOD RANGE INFORMATION CARD

The Air Force shall prepare and distribute a pamphlet/information card to Brick Quarters residents explaining the purpose and need for the EOD range, and the sounds that the residents might hear from the range. The purpose of this information is to educate and raise awareness, and to lessen the impacts to the residents through this process.

IV. CONCRETE FOUNDATIONS IN HUFFMAN PRAIRIE FLYING FIELD

- A. The Air Force, in consultation with staff from Dayton Aviation Heritage National Historical Park, shall investigate the concrete foundation remnants recently discovered by National Park Service staff at several locations in Huffman Prairie Flying Field and prepare a brief report summarizing their findings regarding the origins and historic significance of these objects.
- B. With the report required by Stipulation IV.A serving as the basis for discussions, the Air Force shall consult with the SHPO and the National Park Service regarding the historic significance of the concrete foundation remnants and evaluate treatment options, including removal.
- C. If the Air Force, the SHPO, and the National Park Service agree that removal of the concrete foundation remnants is appropriate, the Air Force shall determine the feasibility of removing the objects. If it determines that removal is feasible, the Air Force shall:
 - 1. complete Section 106 consultation regarding the removal with the SHPO and the National Park Service, as required by 36 CFR Part 800; and
 - 2. remove the concrete foundation remnants from Huffman Prairie Flying Field

V. INTERPRETIVE SIGN FOR NATIONAL AVIATION HERITAGE AREA

The Air Force shall fund and have designed and installed an interpretive sign at Huffman Prairie Flying Field Interpretive Center which will convey to visitors information regarding other aviation sites within the National Aviation Heritage Area. The sign will provide a description of the National Aviation Heritage Area along with contact information and directions to the various National Aviation Heritage Alliance sites. The intent of the sign is to present to visitors other aviation sites of interest connected to the Huffman Prairie Flying Field and thereby enhance cultural outreach goals with respect to historic Air Force properties. The Air Force shall install such signage at the Huffman Prairie Flying Field Interpretive Center at a location mutually agreed to by the Air Force, Dayton Aviation Heritage National Historical Park, and the National Aviation Heritage Alliance.

IX. AMENDMENTS

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

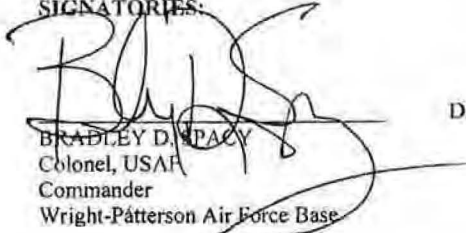
X. TERMINATION

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation VIII, above. If within thirty (30) days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.


Once the MOA is terminated, and prior to work continuing on the undertaking, the Air Force must either (a) execute an MOA pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. The Air Force shall notify the signatories as to the course of action it will pursue.

Execution of this MOA by the Air Force and SHPO and implementation of its terms evidence that the Air Force has taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

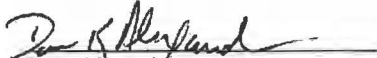

BRADLEY D. SPACY
Colonel, USAF
Commander
Wright-Patterson Air Force Base

Date 19 MAR 2010

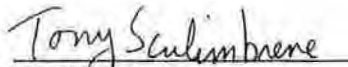

Mark J. Epstein, Department Head
Resource Protection and Review
Ohio Historic Preservation Office

Date 3.29.10

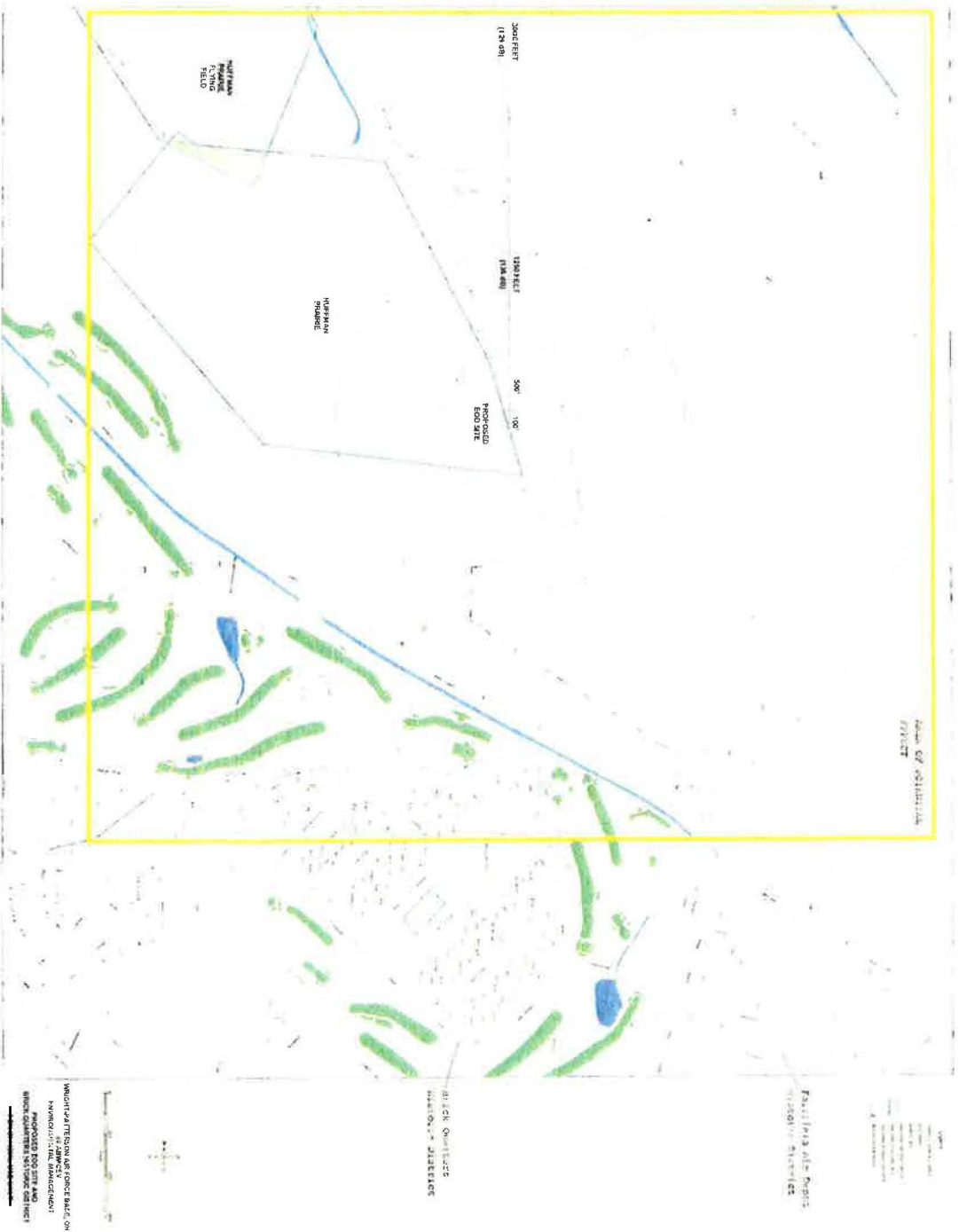
CONCURRING PARTIES:


Dean Alexander
Superintendent
Dayton Aviation Heritage National Historical Park
National Park Service

Date 3/22/10


Tony Sculimbrene
Executive Director
National Aviation Heritage Alliance

Date 22 Mar 10



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Ohio Environmental Protection Agency

From: [Selby, Gary W Civ USAF AFMC 88 ABW/CEVY](#)
To: [Clendenin, Timothy L Civ USAF AFMC 88 ABW/CEVY](#); [Mays, Mark L YF-03 USAF AFMC 88 ABW/CEV](#);
cc: [Banford, John R Civ USAF AFMC 88 ABW/CEVS](#);
[Mitchell, Brian A Civ USAF AFMC 88 ABW/CEVS](#);
[Baker, Raymond F Civ USAF AFMC 88 ABW/CEVO](#);
Subject: FW: former EOD
Date: Monday, April 28, 2008 2:46:18 PM

Got this from Ohio EPA.

-----Original Message-----

From: Brian Gitzinger [<mailto:Brian.Gitzinger@epa.state.oh.us>]
Sent: Monday, April 28, 2008 2:19 PM
To: Selby, Gary W Civ USAF AFMC 88 ABW/CEVY
Cc: Harold OConnell; Paul Pardi
Subject: former EOD

Gary,

Last week you asked if there was any hazardous waste requirements which must be addressed prior to constructing on the former EOD in Area A/C. May this serve as a response.

Based on speaking with both Harold and Paul, 3745-27-13 does not apply. 3745-27-13 regulates grading, excavating, etc within former solid and hazardous waste facilities.

However any use of the former EOD property must be in accordance with WPAFB's use restrictions as referenced in Ohio EPA's May 3, 2000 letter to WPAFB titled "Completion of Partial Closure". It appears the use is limited to industrial and residential use is prohibited.

If you have further questions please call me.

Brian Gitzinger
Ohio EPA
(937) 285-6082

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Other Correspondence

		Consultation Issues				
Date	Nature of Correspondence	Sandhill Site	Former EOD Site	Hebble Creek Road Site	Skeel Avenue Site	Outcome
Miami Conservancy District						
9/23/2008	WPAFB Consultation Request	Formal request for consultation on Alternatives 1 - 3			Not specifically included in request	
10/1/2008	MCD Response	No adverse comments regarding project; comments provided on a basewide level				Concluded that EOD range as proposed will have little or not impact on floodplain capacity on a base-wide basis
The Nature Conservancy						
3/12/2009	Invitation to Comment on EOD Proposal	Invitation to review and comment on EA for the 4 Alternatives				

Other Correspondence

		Consultation Issues				
Date	Nature of Correspondence	Sandhill Site	Former EOD Site	Hebble Creek Road Site	Skeel Avenue Site	Outcome
3/25/2009	TNC Response	No adverse comments				
National Aviation Heritage Area						
10/24/2008 (Copy of EA provided on 4/14/09)	Invitation to Comment on EOD Proposal	Invitation to comment on proposed EOD project			Skeel Ave Site included in EA forwarded for review on 4/14/09	
5/5/2009	NAHA Response	No Objections to Proposed Sites	Concerns regarding proximity of proposed project to HCFF		Concur with FONSI at Skeel Ave Site	Relayed concerns over potential impacts at Alternative site #2
5/20/2009	Additional NAHA Comments	No Objections to Proposed Sites			Skeel Ave Site is preferred location for EOD project	Relayed concerns over potential environmental and financial impacts at Alternative site #2
Advisory Council on Historic Preservation						

Other Correspondence

		Consultation Issues				
Date	Nature of Correspondence	Sandhill Site	Former EOD Site	Hebble Creek Road Site	Skeel Avenue Site	Outcome
12/17/2009	Invitation to Comment on EOD Proposal	Invitation to comment on proposed EOD project				
2/1/2010	ACHP Response	Declined active role in consultation process				WPAFB must submit copy of the executed MOA to ACHP to complete consultation process with other agencies
Community Correspondence						
4/10/09 - 5/10/09	Public Invitation to Comment	Published in Dayton Daily News and the WPAFB Skywriter on April 10, 2009 and mailed to City of Fairbor, NAHA, Tribal Authorities of Tribes previously requesting inclusion in consultation requests				One comment received (4/21/09)
4/21/2008 (correct date 4/21/09)	Citizen Comment	Concerns regarding quality of life impacts from noise and potential economic impacts to property values	No Adverse Comments			WPAFB provided written response (8/17/09) acknowledging concerns
8/17/2009	Response to Citizen Comment (4/21/09)					

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Miami Conservancy District



DEPARTMENT OF THE AIRFORCE

HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

23 September 2008

88 ABW/CEVY
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Kurt Rhinehart
Miami Conservancy District
38E Monument Avenue
Dayton, OH 45402

Subject: Floodplain Impacts
Environmental Assessments
Wright Patterson AFB
Greene County, Ohio

Dear Mr. Rhinehart:

Wright-Patterson AFB is preparing two Environmental Assessments for two projects designed to support training efforts on the base.

The first EA will evaluate the proposed construction and operation of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range. The proposed locations for the EOD range are

- I. Former EOD range (Area C of WPAFB), elevation: 790-800 feet MSL.
- II. Property north of Hebble Creek Road and west of the Huffman Prairie Flying Field (Area C of WPAFB), elevation: 795 feet MSL; and
- III. Sand Hill (north of Area C of WPAFB), elevation: 865-915 feet MSL.

The second EA will evaluate the proposed National Air and Space Intelligence Center (NASIC) and the U.S. Air Force School of Aerospace Medicine Expeditionary Medical Support (USAFSAM EMEDS) field training activities at the former Aircraft Battle Damage and Repair (ABDR) Facility site (elevation 802 feet MSL). The sites of these project alternatives are shown in Attachment 1.

As part of these assessments, we are requesting your assessment regarding the potential impacts of the project alternatives on floodplain.

The first EA involves providing proficiency training to EOD personnel. At worst case this involves 2 days/week, 4 hours/day of training. The four hours involve setting up/training for the detonation of explosive materials (maximum explosive material detonated is five pounds C4 at one time). The actual detonation/explosion takes less than one second. The "clear" zone around the detonation site is a 500 feet radius. The detonations will be performed inside a walled containment barrier, most likely concrete. On an emergency basis only, this site will also be used to detonate unexploded ordnance that come from the base or also from the public; this is a random occurrence with a frequency of maybe once/month. This project would involve constructing a precast concrete barrier six feet tall, approximately 46 feet long x 24 feet wide, with two open entrances. Two smaller barriers (approximately 6 feet long x 6 feet wide x 4 feet high) to contain tools and explosive materials, and a gravel access road and parking area would also be constructed. See Attachment 2 for examples of the barriers.

The locations of the former EOD range and the property west of the Huffman Prairie Flying Field are within the 100-year floodplain of the Mad River at Huffman Dam of 814.3 feet MSL. Structures of any type within the floodplain behind the Huffman Dam shall not be erected more than 5 feet below the Huffman Dam spillway elevation (835 feet MSL) except by Miami Conservancy District authorization. The elevation of the concrete barrier

would be below this elevation, however it is neither a residential or commercial structure, and no fill material would be required for this project. Any material excavated during construction would be removed from the retarding basin.

The second EA involves utilizing the existing facility of the former ABDR, and minor site improvements for mobile medical facility training. The location of the former ABDR is within the 100-year floodplain of the Mad River. However, no permanent structures would be located at this site. Only personnel and portable equipment, such as generators and medical equipment, would be used.

We request your input regarding the level of significance that the proposed projects would have on the Miami Conservancy District. If you have any questions, please contact me at (937) 257-0177 or by email at Raymond.Baker@wpafb.af.mil.

Sincerely



RAYMOND F. BAKER
Chief, Quality Branch
Environmental Management Division

cc: Jeff Jones/ Tetra Tech:

Attachments:

1. USGS Quadrangle & Aerial Photo Maps
2. Barrier Photo and Drawing

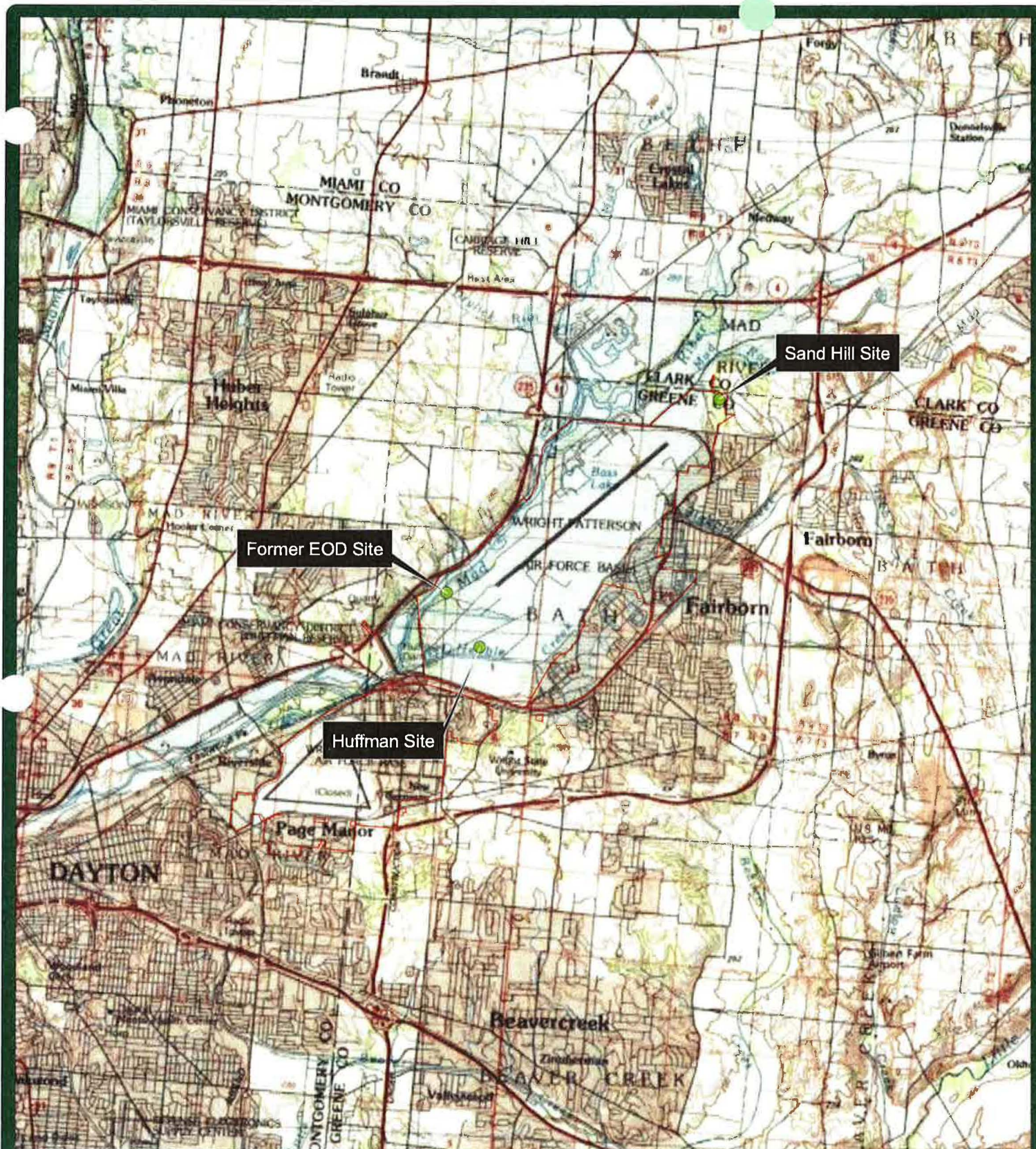


Figure 1. Project Location and Topography
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 0.75 1.5 Miles

Project Information
Project Number : 008-0185-01
Modified September 16, 2008

Legend

- Installation Area
- Detonation Structure Location

NRC

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995

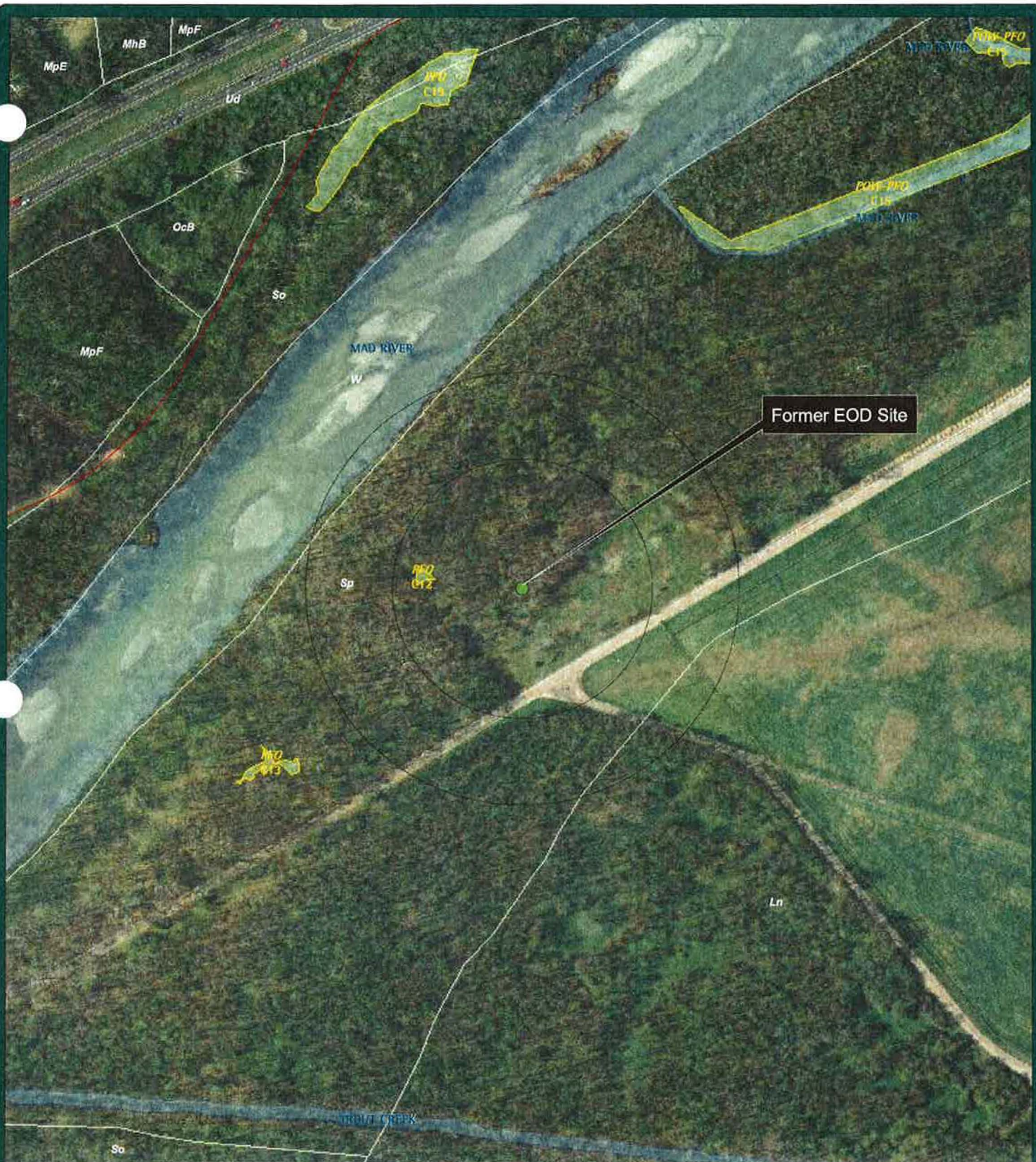


Figure 2. Environmental Features
Wright-Patterson Air Force Base

CONFIDENTIAL



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Wetland Area
- Environmental Restoration Site
- Soil Map Unit Area
- Waterway

NRC
National Remediation Corporation, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995

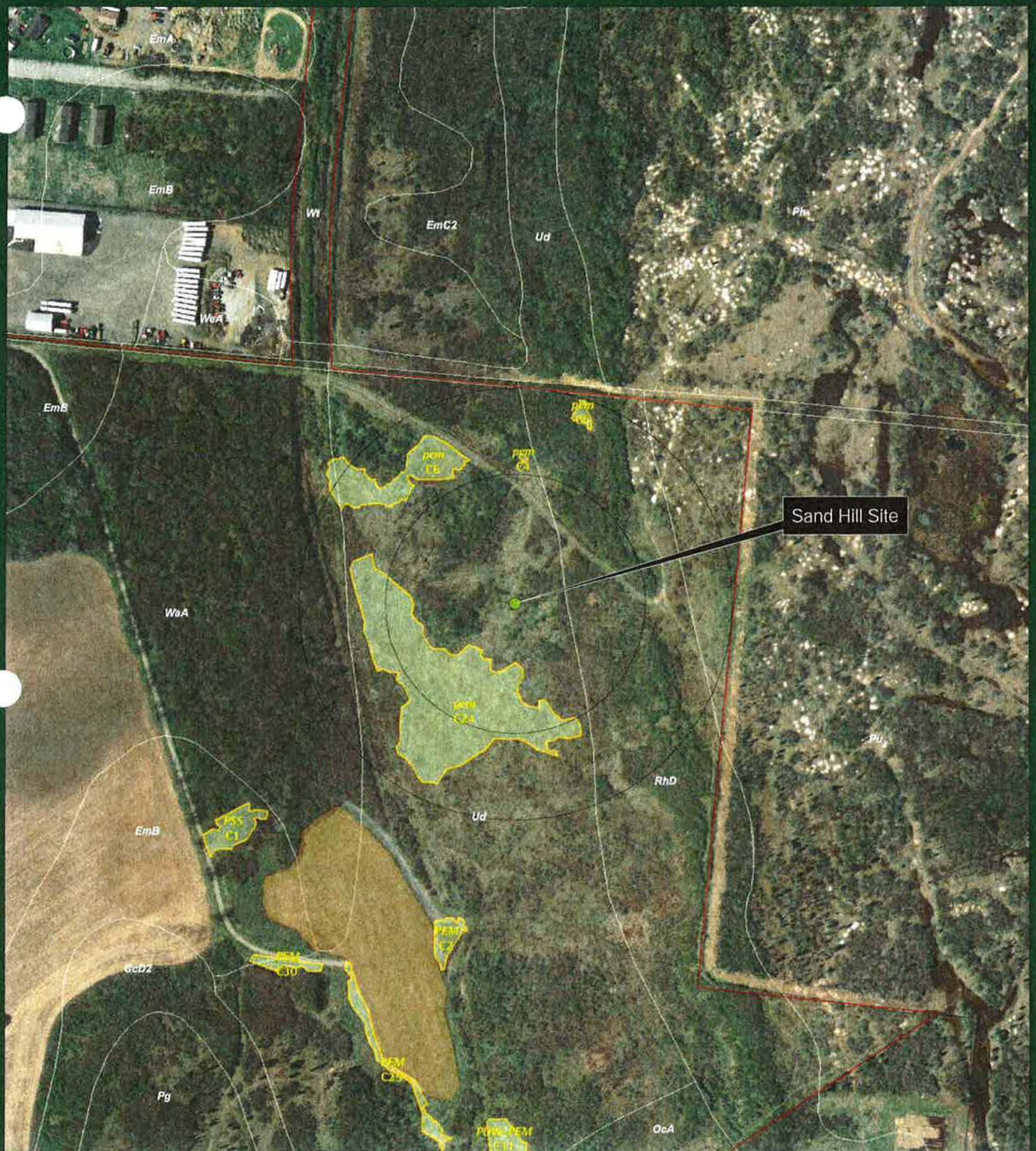


Figure 2. Environmental Features
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Wetland Area
- Environmental Restoration Site
- Soil Map Unit Area
- Waterway

NRC
Natural Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-833-1998
fax: 608-833-1995

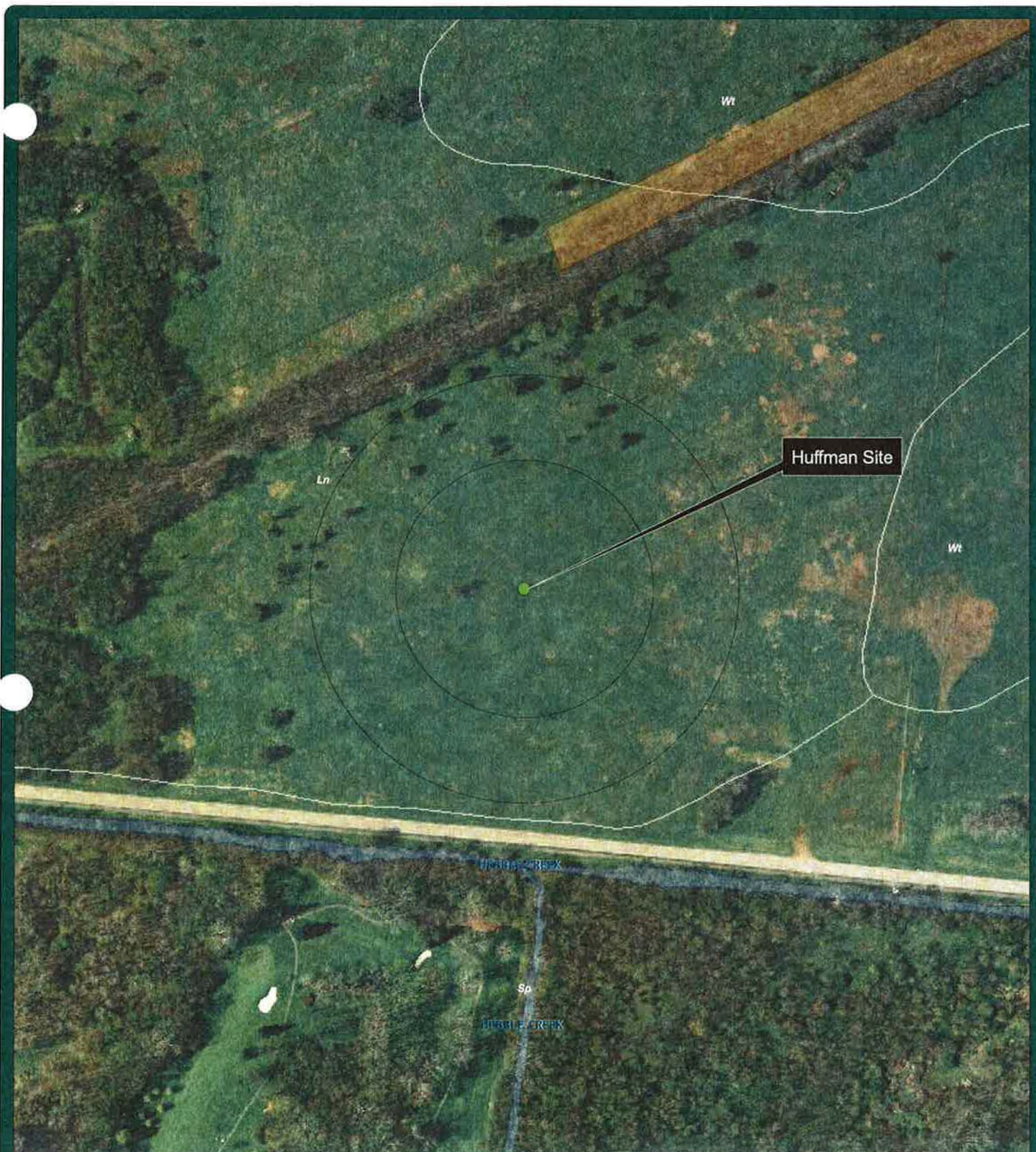


Figure 2. Environmental Features
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified September 19, 2008

0 150 300 Feet

North Arrow

Legend

- Installation Boundary
- Detonation Structure Location
- Detonation Structure Buffer (300 and 500 ft)
- Wetland Area
- Environmental Restoration Site
- Soil Map Unit Area
- Waterway

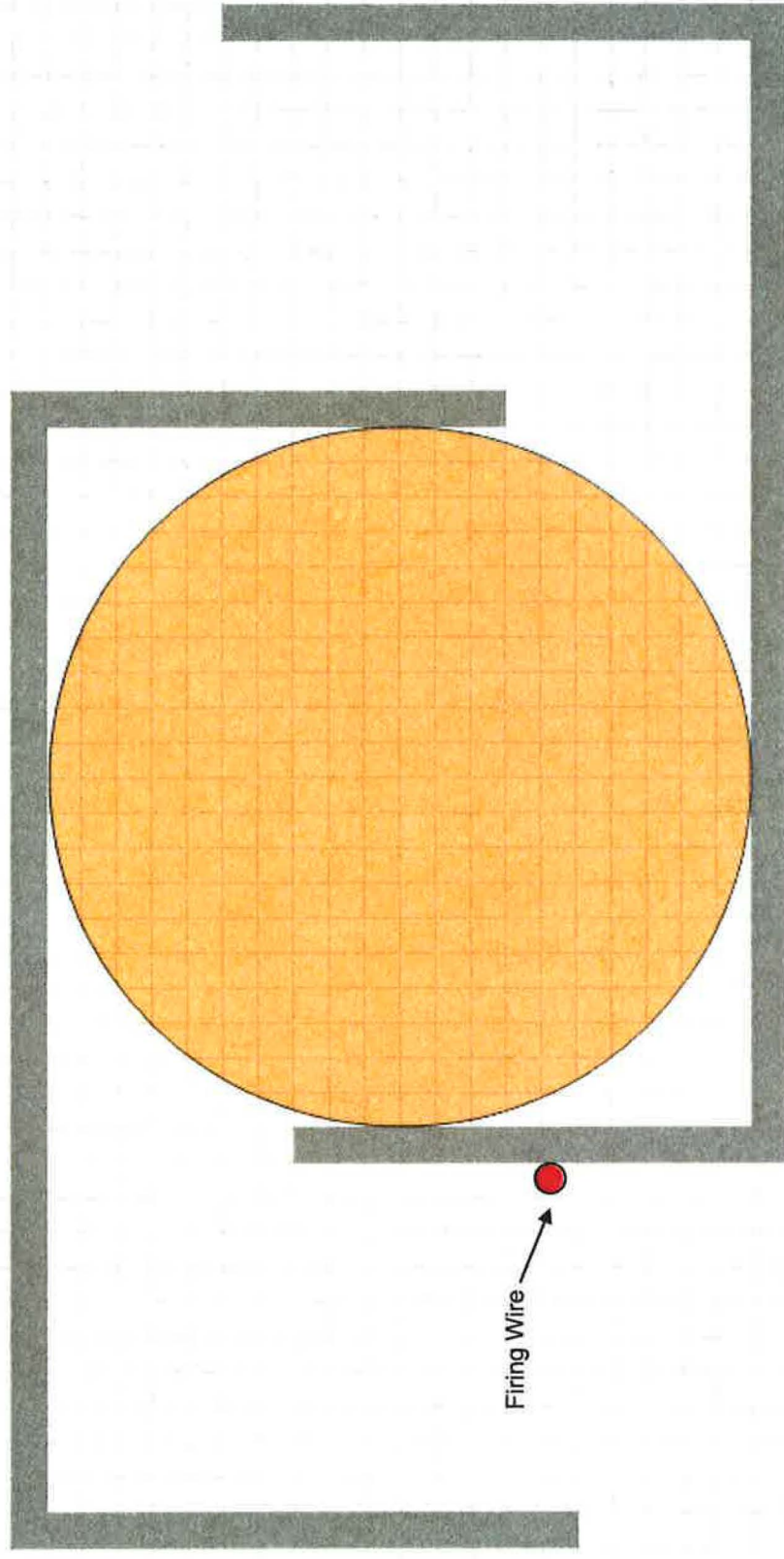
NRC
National Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995

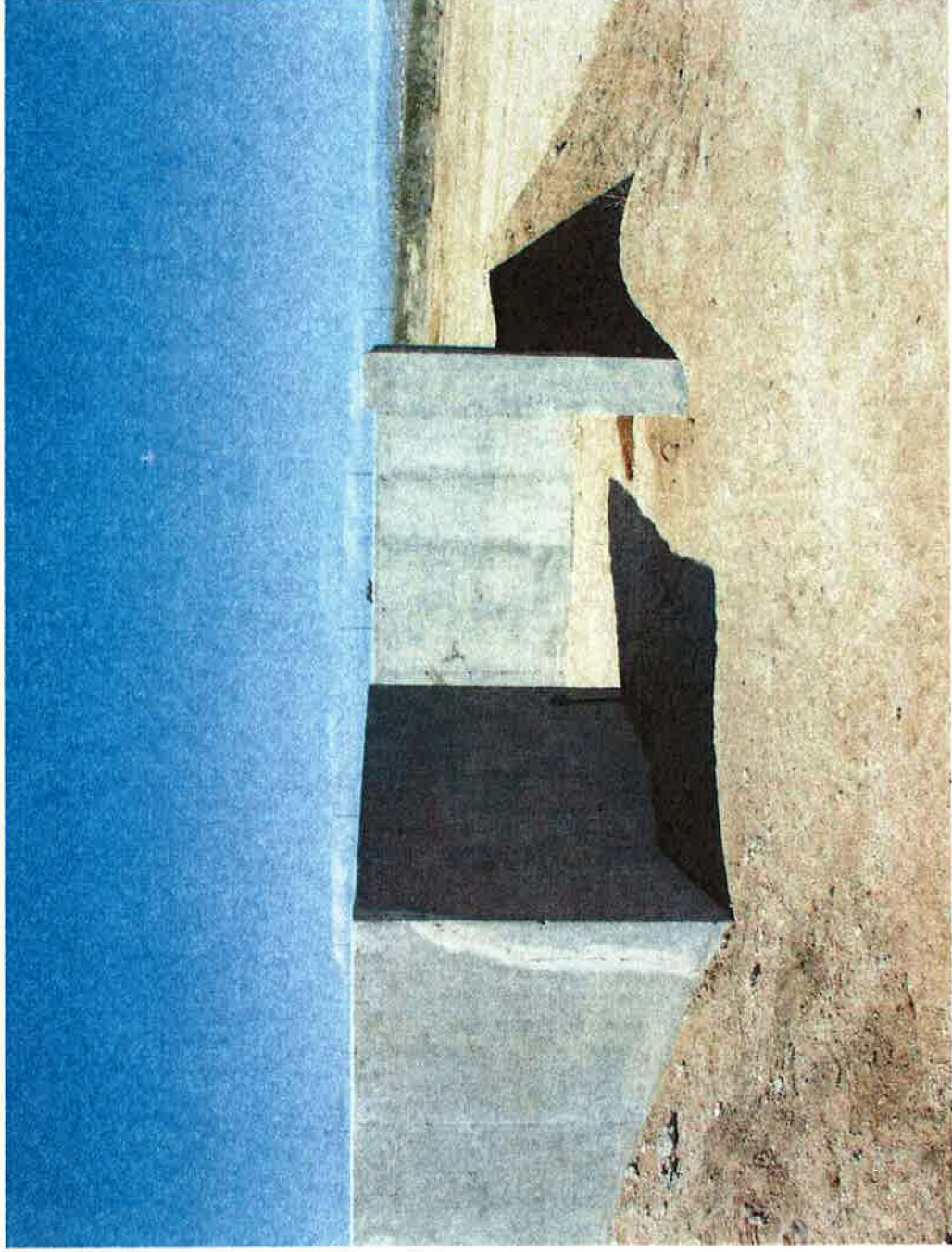
Suggested Option

-Area will need to be no less than 46'x 24'

-20' diameter circle



Example of Barrier



Holding Area



Tool Check Out Bunker





**MIAMI
CONSERVANCY
DISTRICT**

BOARD OF DIRECTORS

William E. Lukens
Gayle B. Price, Jr.
Thomas B. Rentschler

GENERAL MANAGER
Janet M. Bly

October 1, 2008

*Rec'd
WFB 30 Oct 08*

Mr. Raymond F. Baker
88 ABW/CEVY
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Re: Floodplain Assessment

Dear Mr. Baker:

We have reviewed the proposed development of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range and the proposed development of the National Air and Space Intelligence Center (NASIC) and the U.S. Air Force School of Aerospace Medicine Expeditionary Medical Support (USAFSAM EMEDS) field training activities.

As most of the proposed building sites for the above referenced facilities are located within the Huffman Retarding Basin all development would be subject to those building restrictions as set forth by the Miami Conservancy District (MCD). Based on our review it appears the proposed facilities will have little, if any, impact on the retarding basin.

As the ground elevation at site I & II is somewhere between 790-800 feet there remains a potential for flooding at the site as indicated by the following information.

The 100-year flood pool is at elevation 814.3

The 200-year flood pool is at elevation 817.6

MCD has the right to back water upstream of Huffman dam to a spillway elevation of 835.0

Your cooperation regarding this matter is appreciated and if you have any further questions please contact me at (937) 223-1278, ext. 3219.

Very truly yours,

Richard L. Doran
Property Administrator

cc: Kurt Rinehart

File: WPAFB

The Nature Conservancy

From: Terri Zick [mailto:tzick@cticompanies.com]

Sent: Thursday, March 12, 2009 3:13 PM

To: Marleen Kromer

Cc: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY; jj45322@aol.com; Matt Schramm; Beason, Karen N Civ USAF AFMC 88 ABW/CEVO

Subject: Briefing on proposed project at WPAFB

Marleen-

Thank you again for your interest in the proposed project at WPAFB.

The attached letter and figures have been prepared to familiarize you with the project that WPAFB is considering at the northeast perimeter of the Huffman Prairie. I will be pleased to discuss general details of the proposed scope with you, although in-depth questions on the project should be directed to Raymond Baker or Karen Beason at the base. Contact information is included in the attached letter.

Thank you!

Terri Zick

The information contained in this electronic message is privileged and/or confidential information intended only for the use of the individual or entity named above. If the reader of this message is not the intended recipient, or the employee or agent responsible to deliver it to the intended recipient, you are hereby notified that any dissemination, distribution or copying of the communication is neither allowed nor intended. If you have received this communication in error, please immediately notify us by return e-mail or by calling 800-CTI-TODAY and delete the message. Thank You!

3/31/2009

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

March 12, 2009

88 ABW/CEVY
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Ms. Marleen Kromer
The Nature Conservancy
6375 Riverside Drive
Suite 100
Dublin, OH 43017

Subject: Environmental Assessment
Wright Patterson AFB
Greene County, Ohio

Dear Ms. Kromer:

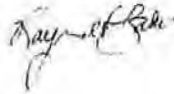
Wright-Patterson AFB is preparing an Environmental Assessment (EA) for a project designed to support training efforts on the base. The EA is intended to evaluate the proposed construction and operation of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range at a location identified as the Skeel Avenue Site (Area C of WPAFB). As part of this assessment, we are seeking informal consultation with The Nature Conservancy in support of the project designed to support training efforts at WPAFB.

The proposed EOD operation, involves providing proficiency training to EOD personnel. At worse case this involves 3 days/week, 8 hours/day of training. The 8 hours involves setting up/training for the detonation of explosive materials (maximum explosive material detonated is 5 lbs C4 at one time). The actual detonation/explosion takes less than 1 second. The "clear" zone around the detonation site is a 500 foot radius. The detonations will be performed inside a concrete walled containment barrier. This site will also be used to detonate unexploded ordnance that comes from the base or the public; this is a random occurrence with a frequency of maybe once/month.

The attached maps provide information on the location of the Skeel Avenue site which is under consideration. The location of the boundary of the Huffman Prairie, a State of Ohio Natural Landmark, in relation to the proposed project site is identified on the drawings. Known locations of potential endangered species habitats in the vicinity of the alternative site location are also provided in the attached maps.

Thank you for your consideration. Please return your comments to me at the above address. If you have any questions, please contact me at (937) 257-0177 or by email at Raymond.Baker@wpafb.af.mil.

Sincerely

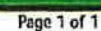


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Date: 2009.03.12 11:52:33 -0400

RAYMOND F. BAKER
Chief, Quality Branch
Environmental Management Division

Enclosures: USGS Quadrangle Map
Aerial Photo Map
Wetlands and Endangered Species Habitat Map

cc: Jeff Jones/Tetra Tech



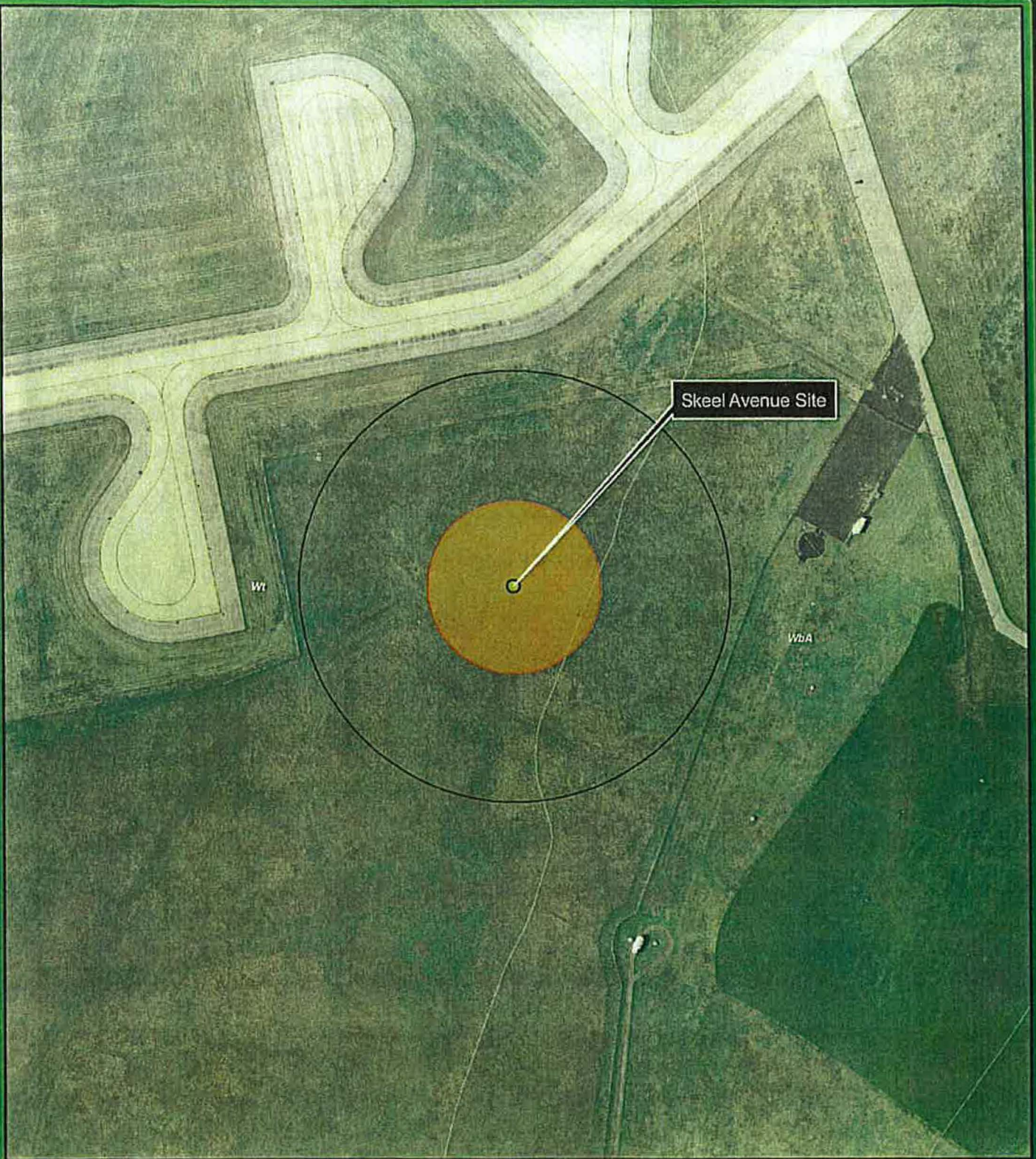


Figure 2. Environmental Features
Wright-Patterson Air Force Base

~~CONFIDENTIAL~~



Location
TOBN, R02E
Greene County, OH

0 150 300 Feet

Project Information
Project Number : 008-0185-01
Modified March 06, 2009

Legend

- Disturbance Structure Location
- Combustion Free Zone (200 ft)
- Disturbance Structure Buffer (600 ft)
- Wetland Area*
- Environmental Restoration Site*
- Soil Map Unit Area
- Waterway*

*Not Present in Data Frame

NRC
National Resource Consulting, Inc.
209 Commerce Parkway
P.O. Box 128
Gadsden, GA 30301-0128
Phone: 608-623-1908
Fax: 608-623-7955
www.nrcplanning.com



Figure 3. Threatened and Endangered Species Occurrences
Wright-Patterson Air Force Base

CONFIDENTIAL



Location
T08N, R02E
Greene County, OH

Project Information
Project Number : 008-0185-01
Modified March 12, 2009

- Legend**
- Detonation Structure Location
 - Combustible Free Zone (200 ft)
 - Distention Structure Buffer (500 ft)
 - Blazing Star Stem Borer
 - Huffman Prairie

NRC
National Resources Consulting, Inc.
207 Commerce Parkway
P.O. Box 128
Cottage Grove, VA 23277-0128
Phone: 803-839-1979
Fax: 803-839-1066
www.nrc-inc.com

Terri Zick

From: Marleen Kromer [mkromer@TNC.ORG]
Sent: Wednesday, March 25, 2009 4:43 PM
To: Baker, Raymond F Civ USAF AFMC 88 ABW/CEVY
Cc: Terri Zick; jj45322@aol.com; Matt Schramm; Beason, Karen N Civ USAF AFMC 88 ABW/CEVO
Subject: RE: Briefing on proposed project at WPAFB
Attachments: Briefing Letter TNC.pdf

Hi Raymond,

Thanks for giving The Nature Conservancy an opportunity to comment on the proposed Huffman Prairie location for the base's EOD project as outlined in the attachment. I enjoyed our conversation and realize that there are a lot of complicated details to work out in siting projects of this type. As we discussed, my review of the project raised a couple of concerns.

Briefly, these include the potential loss of prairie habitat, both within the official boundary of Huffman Prairie and the area north of the prairie which contains prairie vegetation, even though that area has not been managed as part of Huffman Prairie in the past. Given the overall size of the affected area relative to the prairie overall, this loss would be considerable.

Another concern is the impact that regular explosions at this location would have on the breeding behavior of migratory grassland birds that have been documented using Huffman Prairie as a nesting site. While the bird species known to use Huffman Prairie may not be on the federal endangered species list, at least two that have been recorded there, sedge wren and bobolink, are on the Ohio Division of Wildlife's species of concern list. It is known that some grassland bird species are in serious decline due to the loss and fragmentation of this habitat type. As you know, Huffman Prairie is one of the largest remaining native prairies in Ohio and if birds are displaced from this site, they would have a difficult time finding suitable alternative habitat nearby.

These are the two major concerns that immediately come to mind regarding the Huffman Prairie location. If you have any questions please feel free to contact me. Thanks again for inviting comment on this project.

Sincerely,
Marleen Kromer

Please consider the environment before printing this email

Marleen Kromer
Associate Director of Conservation

mkromer@tnc.org
(614) 717-2770 Ext. 118 (Phone)
(614) 717-2777 (Fax)

The Nature Conservancy
Ohio Office
6375 Riverside Dr, Suite 100
Dublin, OH 43017

nature.org

3/31/2009

National Aviation Heritage Area



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

24 October 2008

88 ABW/CEV
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

Tony Sculimbrene
Executive Director
National Aviation Heritage Alliance
P.O. Box 414
Dayton OH 45409

Dear Mr. Sculimbrene

Wright-Patterson Air Force Base (WPAFB) is preparing an environmental assessment for the proposed construction and operation of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range. In accordance with Title 32, Code of Federal Regulations, Part 989, *Environmental Impact Analysis Process*, and Title 36, Code of Federal Regulations, Part 800, *Protection of Historic Properties*, WPAFB is affording you the opportunity to provide comments and/or become a consulting party with regards to this proposed undertaking. The proposed locations for the EOD range are (see Attachment 1 for maps of the proposed locations):

- I. Former EOD range (Area C of WPAFB)
- II. Property north of Hebble Creek Road and west of the Huffman Prairie Flying Field (Area C of WPAFB)
- III. Sand Hill (north of Area C of WPAFB)

The purpose of the EOD range is to provide Air Force required proficiency training to EOD personnel. Training at the EOD range would occur an average of 3 days/week, up to 8 hours/day. The eight hours involve setting up/training for the detonation of explosive materials (maximum explosive material detonated is five pounds C4 at one time). The actual detonation/explosion takes less than one second. The "clear" zone around the detonation site is a 500-foot radius. The detonations will be performed inside a walled containment barrier, most likely concrete. On an emergency basis only, this site will also be used to detonate unexploded ordnance that comes from the base and also from the public. This project would involve constructing a precast concrete barrier six feet tall, approximately 46 feet long x 24 feet wide, with two open entrances. Two smaller barriers (approximately 6 feet long x 6 feet wide x 4 feet high) to contain tools and explosive materials, and a gravel access road and parking area would also be constructed. The site would be fenced off. See Attachment 2 for examples of the barriers.

Please provide written comments and/or your request to become a consulting party by 10 Nov 08 to:

Ms. Estella Holmes
ASC/ENVR
1801 10th Street, Suite 2
Wright-Patterson AFB Ohio 45433-7624
1-800-982-7248 x53395

Sincerely


MARK L. MAYS
Chief, Environmental Management Division
Civil Engineer Directorate

Attachments

1. Proposed Site Locations
2. EOD Barriers



5 May 2009

Mr. Raymond Baker
88 ABW/CEVY
1450 Littrell Rd
Wright Patterson AFB, OH 45433-5209

Dear Raymond,

Come. Discover. Fly!

National Museum of the
United States Air Force

National Aviation
Hall of Fame

Dayton Aviation Heritage
National Historical Park

The Wright B Flyer

Woodland Cemetery
& Arboretum

Historic WACO Field

Armstrong Air &
Space Museum

Wright State University
Wright Archives

Aviation Trail, Inc.
Visitor Center & Museum

Grimes Flying
Lab Foundation

On behalf of the trustees of the National Aviation Heritage Alliance (NAHA) I want to thank you for giving us the opportunity to comment on the proposed Environmental Assessment to Construct an Explosives Ordnance Disposal (EOD) Proficiency Training and Emergency Disposal Range at Wright Patterson AFB. It is our understanding that NAHA is a consulting party for this proposed action by WPAFB.

After reviewing the documents you forwarded by email on 14 April 09, NAHA does not concur with the Finding of No Adverse Affect for the four proposed sites. In particular, locating the proposed EOD facility at Alternative 2: Hebble Creek Road Site will have a significant and adverse impact on Huffman Prairie Flying Field and the Dayton Aviation Heritage National Historical Park and we ask that it not be considered as a potential site. In your own assessment of all four sites, there are more problems listed for this site than any of the other sites. There will be excessive noise, an esthetic impact and the need for additional notification and education of visitors to the Huffman Prairie if the EOD facility is located at the Hebble Creek Road site. In addition, the Air Force fails to describe in its assessment the negative impact to those visitors who are current traveling on Marl Road as they approach the historic site. This route is projected to become the primary route for visitors to use in the future.

In reviewing the other three sites including the proposed action site, Skeel Avenue Site, NAHA concurs with the Finding of No Adverse Affect. However, there is some concern that given the proximity of the EOD facility, noise may be an issue for the Brick Quarters Historic District residents depending on the frequency of detonations and the prevailing winds.

NAHA has always recognized the need to balance the operation of the national park site at Huffman Prairie with critical base activities such as EOD training. We believe selecting any one of the other three remaining sites can satisfy our concerns and at the same time, provide a location for the needed training facility.

Sincerely yours,

Tony Sculimbrene
Executive Director
CC: NAHA Trustees



20 Aug 09

Mr. Raymond Baker
88 ABW/CEVY
1450 Littrell Rd
Wright Patterson AFB, OH 45433-5209

Dear Raymond,

Come. Discover. Fly!

National Museum of the
United States Air Force

National Aviation
Hall of Fame

Dayton Aviation Heritage
National Historical Park

The Wright B Flyer

Woodland Cemetery
& Arboretum

Historic WACO Field

Armstrong Air &
Space Museum

Wright State University
Wright Archives

Aviation Trail, Inc.
Visitor Center & Museum

Grimes Flying
Lab Foundation

Thank you for giving us the opportunity to offer additional comments on the base's plans to site an EOD facility in the vicinity of Huffman Prairie Flying Field. We believe there will be a significant impact on the historic site if the new training range is located at the Hebble Creek Road site and offer the following information in support of our concerns.

Since 2004, the National Aviation Heritage Alliance has actively promoted the aviation heritage sites of the Dayton Region including the Huffman Prairie Flying Field. We have tangible evidence that our marketing efforts are having an impact as visitation to all the sites has risen. For Huffman Prairie and the interpretive center, we are now seeing an average of 1665 visitors per month, compared to a handful of visitors 10 years ago (1999). In addition, based on visitors' comments and surveys, the authentic, as-it-was feel for the Prairie represents one of the most important elements of the visitor experience.

In a recent article published on 12 July 2009 by the Chicago Tribune, one of the nation's largest newspapers, Phil Marty, a veteran travel writer wrote the following:

"Huffman Prairie Flying Field is a huge farm field with thick, long stands of grasses, punctuated here and there by Queen Anne's Lace. But this is where history was made, and, ideally, it's the place to end a visit to view the Wright stuff."

Yes, there are replicas of the 1905 hangar and the catapult system used to launch the early planes, as well as some interpretive signs.

Still, this is one of those places, like Gettysburg, to just sit quietly and think about what went on here.

And if a bird happens to wing by while you're sitting there, well, that's what started it all."

As evident in the Tribune article, the serenity of the Prairie is something that makes this "hallowed" ground for the visitor. Had the EOD facility been in operation with its periodic detonations, it's hard to imagine that Huffman Prairie would have been so eloquently described.



It is easy to project a significant decline in the visitor experience should the EOD facility be placed at Hebble Creek Road as we had very negative reactions from visitors who were at the Flying Field site during the time when the Combat Arms Training and Maintenance Facility (CATM) was in operation. (Relocation of the CATM was in part justified by the impact it created on the Huffman Prairie Flying Field.) The firing of weapons put many visitors on edge, thinking they were in harm's way. The explosions will create the same effect. Ultimately, we would expect a decline of visitation to the site and with just a 10% decline in attendance there will be a subsequent annual economic loss of **\$200,000*** in the Dayton region.

It is our opinion the Skeel Avenue site will create less of a noise impact to the park site given the distance and prevailing winds at WPAFB. However, we concur with the Ohio Historic Preservation Office's concerns related to the impact periodic detonations will have on the residents of the Brick Quarters. It is still our recommendation the former EOD site be selected for this new mission element. It was used successfully for a number of years and only closed as it was no longer needed.

We trust this information will be helpful in making the appropriate decision regarding the location of the EOD range. While NAHA understands the need to conduct military training at WPAFB, we hope base officials will recognize the need to appropriately preserve one of the nation's most significant historic sites, the place where mankind perfected the flying machine.

Sincerely yours,

Tony Sculimbrene
Executive Director

CC: Dayton Aviation Heritage National Historical Park (Supt. Dean Alexander)
Ohio State Historic Preservation Office (Justin Cook)

*- Calculated by use of the **Dayton Region Tourism Economic Impact** model prepared by Economic Stewardship, Sturgeon Bay, WI

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Advisory Council on Historic Preservation



Preserving America's Heritage

February 1, 2010

Ms. Janet Ferguson
Chief, Operations Branch
Environmental Management Division
88 ABW/CEVO
1450 Littrell Road
Wright-Patterson Air Force Base, OH 45433-5209

**Ref: *Construction and Operation of Explosives Ordnance Disposal
Huffman Prairie Flying Field National Historic Landmark
Wright-Patterson Air Force Base, Greene County, Ohio***

Dear Ms. Ferguson:

On December 18, 2009, the Advisory Council on Historic Preservation (ACHP) received the 88th Air Base Wing's (ABW) notification of adverse effect for the referenced undertaking that was submitted in accordance with 36 CFR § 800.6(a)(1) and § 800.10(b) of our regulations, "Protection of Historic Properties." Based upon the information provided, we have concluded that Appendix A, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, of our regulations does not apply to this undertaking. Accordingly, we do not believe our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer, affected Indian tribe, a consulting party, or other party, we may reconsider this decision. Additionally, should circumstances change, and the involved parties cannot come to consensus or need further advisory assistance to conclude the consultation process, please contact us.

While we have elected not to participate in this consultation, we offer the 88th ABW with the following recommendations for a successful resolution for this consultation:

- Consultation under Section 106 is to be an inclusive process involving all parties at the same time. It appears that the 88th ABW has been consulting individually with parties regarding the project location and effects. For the remainder of the consultation the 88th ABW should be meeting with all consulting party members simultaneously.
- Section 106 and the National Environmental Policy Act are two separate, but equal federal laws. Please be mindful of this fact when engaging consulting party members under Section 106. For example, the Midwest Region of the National Park Service stated in its December 2009 letter, to the 88th ABW, that it reviewed the revised draft Environmental Assessment under Section 106. An EA is not a Section 106 document

ADVISORY COUNCIL ON HISTORIC PRESERVATION

1100 Pennsylvania Avenue NW, Suite 803 • Washington, DC 20004
Phone: 202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov

nor should it be implied by a federal agency that it is a Section 106 document. The exception to this rule is when the federal agency is coordinating these two processes under 36 CFR § 800.8, *Coordination with the National Environmental Policy Act*.

- 36 CFR § 800.10(a) requires federal agencies, to the maximum extent possible, to avoid adverse effects to National Historic Landmarks. In your discussions with consulting party members it is important to emphasize steps taken by 88th ABW to avoid adverse effects to the Huffman Prairie Flying Field National Historic Landmark.

Pursuant to 36 CFR §800.6(b)(1)(iv), you will need to file the final Memorandum of Agreement (MOA), developed in consultation with the Ohio SHPO and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the MOA and supporting documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with your notification of adverse effect. If you have any questions or require our further assistance, please contact Ms. Katharine R. Kerr at (202) 606-8534, or via e-mail at kkerr@achp.gov.

Sincerely,



Caroline D. Hall
Assistant Director
Federal Property Management Section
Office of Federal Agency Programs



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

17 December 2009

88 ABW/CEVO
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

Mr. Reid J. Nelson
Director, Office of Federal Agency Programs
Advisory Council on Historic Preservation
1100 Pennsylvania Avenue NW, Room 803
Washington DC 20004-2501

Dear Mr. Nelson

In accordance with 36 CFR Section 800.10(b), we are notifying the Advisory Council on Historic Preservation of a potential adverse effect to Huffman Prairie Flying Field, a National Historic Landmark, as a result of a proposed undertaking at Wright-Patterson Air Force Base (WPAFB), Greene County, Ohio. The proposed project consists of the construction and operation of an Explosives Ordnance Disposal (EOD) proficiency training range in Area C of the installation. Huffman Prairie Flying Field is also a unit of Dayton Aviation Heritage National Historical Park. The site is owned and maintained by the Air Force (WPAFB), but is operated by the National Park Service.

We initially started with three possible locations for the EOD range: the former EOD range site; the property north of Hebble Creek Road and immediately west of Huffman Prairie Flying Field ("Hebble Creek Road site"); and the Sandhill site, our initially preferred location. See Attachment 1 for mapping of these locations. During this time we received coordination letters from several agencies, including the Ohio Historic Preservation Office and the Dayton Aviation Heritage National Historical Park, advising us against selecting the Hebble Creek Road site because of potential impacts on Huffman Prairie Flying Field, and encouraging the use of the Sandhill site. However, a letter of significant concern from the nearby town of Fairborn regarding the Sandhill site, and issues relating to its impacts on aircraft flight paths, caused us to remove the Sandhill site from consideration and seek another site. This ultimately led to the "Skeel Avenue site" as the new preferred location. Please refer to Attachment 1 for mapping of these sites. Although farther removed from Huffman Prairie Flying Field, the Area of Potential Effects includes a 3,000-foot radius from the center of the EOD range based upon noise sound waves extending away from the detonation point. This radius extends into a portion of the flying field; it also extends into a portion of the Brick Quarters Historic District (refer again to Attachment 1 for mapping showing the 3,000 foot radius at the sites).

In their June 22, 2009 letter, the Ohio Historic Preservation Office determined that the proposed project, if constructed at the preferred Skeel Avenue site, was an adverse effect to Huffman Prairie Flying Field; they also commented that the effects had not been fully determined for the Brick Quarters Historic District (Attachment 2). They encouraged us to contact the Midwest Regional Office of the National Park Service regarding impacts to Huffman Prairie Flying Field as a NHL. Correspondence between our office and the NPS Midwest Regional Office is provided as Attachment 3. The NPS Midwest Regional Office has concluded that while the proposed project is an indirect adverse effect, it would not adversely affect

the critical character-defining features of the NHL – its setting as an open grassy meadow and its predominantly historic viewshed.

In accordance with 36 CFR 800.11(e), we are submitting the following documentation:

- a. A description of the undertaking, including graphics (Attachment 4);
- b. A description of the steps taken to identify historic properties (Attachment 5);
- c. A description of the affected historic properties, including characteristics qualifying them; for the National Register of Historic Places (Attachment 6);
- d. A description of the undertaking's effects on historic properties (Attachment 7);
- e. An explanation of why the criteria of adverse effect were found applicable or inapplicable, including any conditions or future actions to avoid, minimize or mitigate adverse effects (Attachment 8); and
- f. Copies or summaries of any views provided by consulting parties and the public (Attachment 9).

Please review the enclosed documentation and let us know whether you and your staff wish to participate in the resolution of potential adverse effects to the Huffman Prairie Flying Field National Historic Landmark. Should you or your staff have any questions during your review, please don't hesitate to contact me at (937) 257-5528, or via email at janet.ferguson@wpafb.af.mil.

Sincerely



JAN FERGUSON
Chief, Operations Branch
Environmental Management Division

Attachments

1. Site Location Mapping
2. Ohio Historic Preservation Office Letter, 22 June 2009
3. Correspondence with NPS Midwest Regional Office
4. Description of the Undertaking
5. Description of Steps Taken to Identify Historic Properties
6. Description of Affected Properties
7. Description of Undertaking's Effects on Historic Properties
8. Applicability of Criteria of Adverse Effect
9. Views of Consulting Parties/Public

cc: Mark Epstein, Ohio SHPO
Katherine Kerr, ACHP
Dean Alexander, Dayton Aviation Heritage NHP

Attachment 1
Site Location Mapping

Attachment 2

Ohio Historic Preservation Office Correspondence

- Oct 24, 2008 – letter from WPAFB to OHPO, stating No Adverse Effect at proposed sites
- Jan 20, 2009 – letter from OHPO requesting more information & analysis on the APE for sites
- Apr 3, 2009 – letter from WPAFB to OHPO providing requested information
- June 22, 2009 – letter from OHPO asserting adverse effect on Huffman Prairie Flying Field and Brick Quarters for Skeel Ave site and Huffman Prairie Flying Field for Hebble Creek site; requested that WPAFB work with the National Park Service regarding impacts to an NHL

Attachment 3

National Park Service Correspondence

NPS – Dayton Aviation Heritage National Historical Park (NPS-DAAV) (*Consulting Party*)

- Oct 24, 2008 – letter to NPS – DAAV requesting comment
- Nov 7, 2008 – letter from park indicating opposition to Hebble Creek site
- May 1, 2009 – letter from park indicating opposition to Hebble Creek site and support for Skeel Ave site

NPS – Midwest Regional Office (NPS-MWRO) (*Consulting Party*)

- Nov 26, 2008 – letter from NPS-MWRO, raising concerns & requesting WPAFB work with NPS-DAAV
- Oct 26, 2009 – letter from WPAFB to NPS-MWRO addressing issues relating to NHL
- Dec 4, 2009 – letter from NPS-MWRO stating indirect adverse affect to HPFF NHL, but approving use of Skeel Ave site

Attachment 4

Description of the Undertaking

The proposed undertaking is to construct and operate an Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range in Area C of Wright-Patterson Air Force Base (WPAFB), in Greene County, Ohio. The purpose of the EOD range is to provide Air Force required proficiency training to EOD personnel.

The Air Force EOD Training Program aims to produce professional, highly qualified, technically proficient EOD teams capable of safely and efficiently performing peacetime and wartime EOD missions. EOD proficiency training enables EOD teams to achieve and maintain a level of competency to safely and effectively deal with explosive hazards. In accordance with Air Force Instruction 32-3001, Air Force Materiel Command Supplement 1, *Explosive Ordnance Disposal Program*, 2 May 2006, all EOD personnel at the installation level are required to participate in unit training.

Training at the EOD range would occur an average of 3 days per week, up to a maximum of 8 hours per day. The eight hours involve setting up and training for the detonation of explosive materials (the maximum amount of explosive material detonated would be the equivalent of five pounds of C-4 at one time). The maximum number of detonations that would occur in a training day is one per hour, or a total of eight. The actual detonation/explosion takes less than one second. The “clear” zone around the detonation site is a 500-foot radius, secured by a fence. The detonations would be performed inside a six-foot tall concrete walled containment barrier (see Plate 1 on the next page for graphics depicting the layout of the proposed range).

On an emergency basis only, this site would also be used to detonate unexploded ordnance that comes from the base and also from the public.

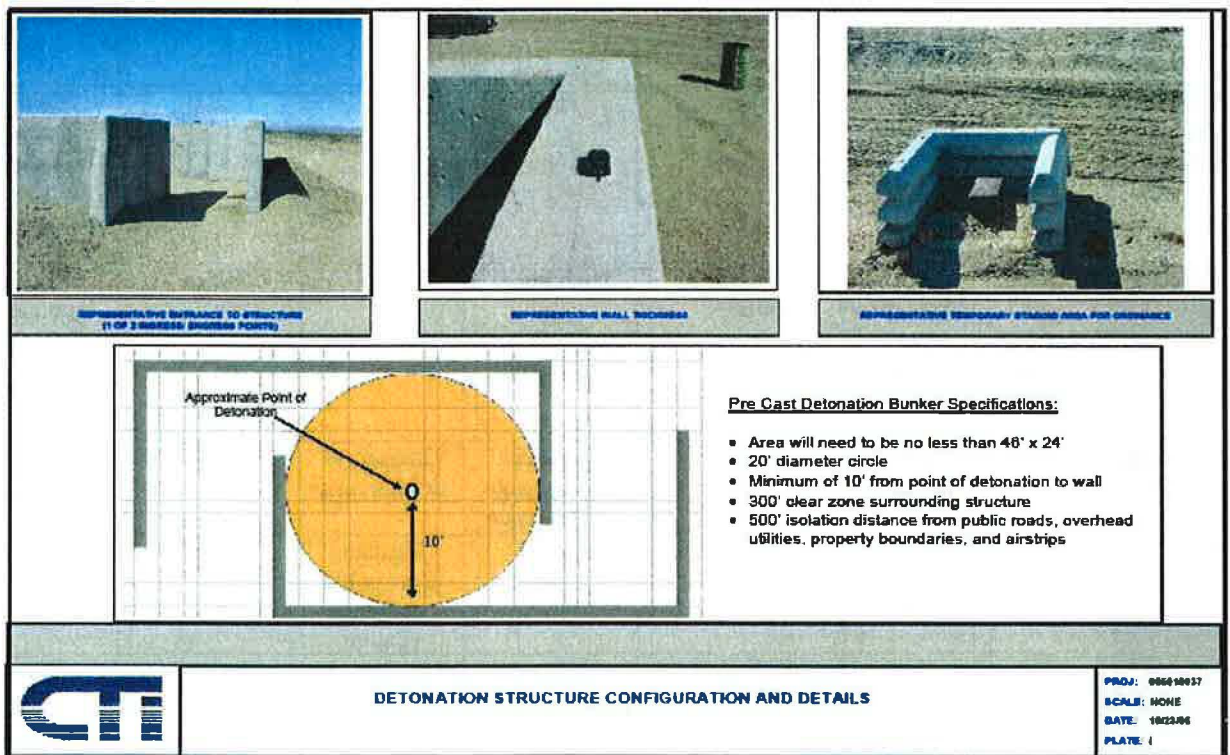
During the environmental assessment process, four sites were fully analyzed (see Attachment 1):

- a. **Proposed Action: Skeel Avenue Site.** This site is located on the northern boundary of the Huffman Prairie in Area C of WPAFB, just south of the Airfield Hazardous Cargo Pads.
- b. **Alternative 1: Former EOD Range.** This site is located in Area C of WPAFB north of the intersection of Riverview and Symmes Roads, approximately 400 feet east of the Mad River.
- c. **Alternative 2: Hebble Creek Road Site.** This site is located in Area C of WPAFB north of Hebble Creek Road and approximately 900 feet west of the western boundary of Huffman Prairie Flying Field.
- d. **Alternative 3: Sandhill Site.** This site is located northeast of State Route 235 and east of Haddix Road, outside of the fenced area of WPAFB.

The proposed new EOD range was not automatically sited at the located of the former EOD range for several reasons. One, it is located 1600 feet from off-base residences, which places those buildings within the 3,000 foot noise radius. The current gate and fencing situation would require the one road that runs past the former EOD range to be closed down during use of the range, creating operational issues for those facilities farther down the road. Finally, there are regulatory issues associated with the cleanup that

was done at the former range that would complicate its reuse. These factors suggested that a better, less restricted site needed to be sought out.

Initially the three alternative sites were analyzed – former EOD range, Sandhill, and Hebble Creek sites. The Sandhill site was the initial preferred alternative, but was removed from further consideration when the City of Fairborn raised objections (see Attachment 9). The Hebble Creek site was the one preferred by the EOD team and other base organizations, because it has no airfield constraints. However, it was opposed by Civil Engineering because of its proximity to Huffman Prairie Flying Field. The letters received from the SHPO, Dayton Aviation Heritage National Historical Park, National Aviation Heritage Alliance, and the Midwest Regional Office of the National Park Service added to the concerns and forced the base to go back to the drawing board in January 2009 to search out new alternative sites. The matrix below shows the pros and cons associated with an array of sites considered. Finally the base settled on the Skeel Avenue site as the best alternative, given its accessibility, low cost, low impacts to airfield operations, and lesser impacts to Huffman Prairie Flying Field than the Hebble Creek site. In selecting this site the base accepted an impact to the adjacent natural prairie known as Huffman Prairie. It has been a delicate balancing act in trying to find a site that meets a critical mission need while not impacting other mission responsibilities.



Proposed Locations	Violates UFC?	Near Housing ?	Environment Issues?	Potential High Costs?	Community Opposition?	Airfield Issues?	EOD Operational Issues?
Airfield Site: near Haz Cargo Pads (Preferred Site)	No	3000' from BQ	Safety arc overlaps Huff. Prairie 7.5 acres	Install fencing/gate & (access road?)	No	Yes	Notify control tower, potential FOD sweep, can't use when Haz Cargo pads occupied
Hebble Creek Rd Site (Alt. #1)	No	3300' from "The Prairies"	Adjacent to NHL, T&E, floodplain	Install fencing	SHPO, NPS, NAHA	No	No
Former EOD Range (Alt. #2)	No	1600' from off-base residents (low density)	Floodplain T&E; OEPA	Clear land, install gate	No	No	Gate off Riverview Rd during ops, notify control tower
Sand Hill Site (Alt. #3)	Yes APZ1	2000' from off-base residents (densely populated)	T&E Wetlands	Install access road, fencing, clearing land	City of Fairborn, residents	Waiver req'd	Notify control tower, hunters, transport on public roadways
Airfield "Site 4" Taxiway**	No	3000' from BQ	No	No	No	Yes	Notify control tower, potential FOD sweep Near OSS priority 1 resource Requires access through airfield (controlled area)
Landfill 11 Site**	Safety arc overlaps Clear zone	2000' from off-base residents (low density)	T&E, landfill OEPA	High initial cost Routine maintenance	No	Yes	Notify control tower, potential FOD sweep, safety arc overlaps Mad R.
Prairie Trace Driving Range Site**	No	1600' from BQ	No	Displaces driving range, install fence	Impacts to driving range	No	Close to Skeel Ave and fitness jogging track
Area B Runway**	No	Yes and NMUSA F	No	Install fencing	Museum, Base public activities (Tattoo)	No	Transport on public roadways, open view, AFRL laser test range
Dayton PD Bomb Range**	No	No	Unknown	Does not meet AFI32-3001 or AFMAN 91-201	No	No	Transport on public roadways, must schedule w/ Dayton

Attachment 5

Description of Steps Taken to Identify Historic Properties

WPAFB has an active cultural resources management program that is administered by the Environmental Management Division of the 88 Air Base Wing and coordinated with the Ohio State Historic Preservation Officer (SHPO) under Section 106 of the National Historic Preservation Act. The WPAFB cultural resources management program is guided by an Integrated Cultural Resources Management Plan (ICRMP) that provides a programmatic basis for compliance with federal historic preservation law and Air Force historic preservation policy directives and instructions. The ICRMP is periodically updated to remain current and underwent a major revision in 2006.

Since 1990, WPAFB has undertaken several extensive field surveys to inventory historic properties on the base. A number of these properties are currently listed, eligible for, or potentially eligible for inclusion on the National Register of Historic Places (NRHP), to include several prehistoric and historic archaeological sites, approximately 260 historic buildings (primarily dating to WWII or earlier) and three historic districts (including one military housing district). Details of the archaeological field surveys, historic building surveys, and assessments of the historic districts are contained in the ICRMP. Based on the results of the previous surveys and the high level of disturbances from past activities in many areas of the base, all of the grounds within the Areas of Potential Affect at the Proposed Action and Alternatives are regarded as having been surveyed for cultural resources (ICRMP 2006).

In addition to the three historic districts, WPAFB is also the home of Huffman Prairie Flying Field, site of the Wright brothers' development and testing of the world's first practical airplane and location of the Wright Brothers School of Aviation. This site is a National Historic Landmark and is part of the Dayton Aviation Heritage National Historical Park. The property is owned by the Air Force but is operated by the National Park Service (NPS). WPAFB and NPS have an agreement that allows public access to the flying field, with designated exceptions reserved for military use. Public access to the Flying Field is provided through Gate 16-A off of State Route 444, along the southwestern boundary of Area C. However, during times of elevated threat levels or as demanded by the military mission, the installation can limit access to the site as necessary to maintain security.

Attachment 6

Description of Affected Properties

To evaluate potential safety concerns and structural impacts associated with surrounding buildings from detonation impact associated with operation of the proposed EOD range, blast calculations were conducted by WPAFB. The blast calculations were conducted by a professional engineer (P.E.) using appropriate modeling software (Blast/FX v.2.2). The calculations were conducted assuming the maximum quantity of explosives (5 pounds of C-4) that would be detonated inside the six-foot tall vented concrete bunker during the training operations. The blast analysis used a 100-foot standoff distance from the detonation point to assess these potential damages. The model analysis revealed that structural damage to the bunker walls would not be expected and that the shock front can be expected to quickly dissipate at the 100-foot standoff distance. Historic structures located outside of the 500-foot clear zone therefore would not be at risk of structural damage from EOD training operations.

Proposed Action: Skeel Avenue Site

No cultural resources are known to occur within the location for the proposed EOD facilities or within the required 500-foot clear zone.

Grounds with the potential to yield archaeological resources were evaluated in 1994-1995 by the Great Lakes Archaeological Research Center (ICRMP 2006). No properties eligible or potentially eligible for inclusion in the NRHP were identified during the field surveys within the proposed EOD facility location, the 200-foot combustible free zone, or the 500-foot clear zone. One historic residential site (R8T3S3 #14) inside the active airfield (near the access road for this alternative) was found to be heavily disturbed and determined to be ineligible for the NRHP. The Ohio SHPO concurred with this determination based upon review of the ICRMP.

A small portion (6.0 acres) of the Huffman Prairie Flying Field falls within the 129 dB contour for projected blast noise. This noise contour extends up to 350 feet inside the fence line that marks the eastern boundary of the HPFF (see Attachment 1). A replica of the 1905 hangar used by the Wright brothers is located outside of the projected noise contours for the EOD facility, about 230 feet to the west of the 129 dB noise contour.

The projected noise contours for the project also encompass a portion of the Brick Quarters Historic District, which is located about 2200 feet to the east of the proposed EOD detonation location (see Attachment 1). About 17.1 acres of this historic district fall within the 129 dB projected noise contour for the EOD facility. The Brick Quarters Historic District contains 123 contributing buildings and one contributing structure (turtle pond) that were built between 1935 and 1937 (ICRMP 2006). Located in the northeast side of Area A, this historic district is an active military family housing area consisting of officers' housing with detached and semidetached garages, an Officers' Club, and related service facilities. Contributing buildings to the Brick Quarters Historic District that fall within the 129 dB noise contour include facility numbers 10616, 10619, 10621, 10700, 10701, 10702, 10704, 10706, 10712, 10715, 10716, 10800, 10860, 11541, 11542, 11548, 11549, 11550, 11551, 11552, and 11553.

Alternative 1: Former EOD Site

No cultural resources are known to occur within the location for the project area (200-foot combustible free zone plus proposed EOD facilities) or within the required 500-foot clear zone. An archaeological field survey completed within the grounds encompassing the project area in 1994-1995 (ICRMP 2006)

did not reveal any properties eligible or potentially eligible for inclusion in the NRHP. There are two archaeological sites within the overall Area of Potential Effect (APE) for this location. Approximately 900 feet to the west is historic archaeological site 33GR1023, which is eligible for listing on the National Register of Historic Places (NRHP). This site is referred to as Kneisly Village, which was occupied from the mid-nineteenth century through to the construction of the Huffman Dam in the early twentieth century. To the southeast is prehistoric archaeological site 33GR918, a short-term Archaic campsite, which is eligible for listing on the NRHP. T

Alternative 2: Hebble Creek Road Site

No prehistoric or historic archaeological resources are known to occur within the location for the project area (200-foot combustible free zone or proposed EOD facilities) or within the required 500-foot clear zone. Grounds within the vicinity of this area with the potential to yield archaeological resources were evaluated in two separate field surveys in 1994-1995 and 2002 (ICRMP 2006). No properties eligible or potentially eligible for inclusion in the NRHP were identified during the field surveys. Additional archaeological field surveys have not been conducted within this alternative project area due to pervasive ground disturbances associated with past military operations. The Ohio SHPO concurred with this determination based upon review of the ICRMP.

However, the Huffman Prairie Flying Field (HPFF), a registered National Historic Landmark is located approximately 900 feet east of the proposed location of the EOD facilities for this alternative (see Attachment 1). The 200-foot combustible free zone for this alternative would extend to within approximately 700 feet of the HPFF. In addition, a portion of the HPFF falls within the blast noise contours associated with operation of the proposed EOD facilities (see Attachment 1). A small portion of HPFF (up to 350 feet inside the fence line that marks the field's western boundary) falls within the 136 dB contour for projected blast noise and the majority of the HPFF, including a number of the trails, interpretive facilities, and parking areas, falls within the 129 dB noise contour. A replica of the hangar used by the Wright brothers for equipment and airplane storage is located about 100 feet east of the 129 dB noise contour.

Preliminary responses provided by the SHPO in response to the request for consultation have included a concern that location of the proposed EOD range at this alternative site will have significant and permanent effects on the use of this unit of the National Park. They have strongly encouraged WPAFB to select another location for development of the EOD range and recommended further study and consultation prior to rendering final comments.

Alternative 3: Sandhill Location

No cultural resources are known to occur within the location for the proposed EOD facilities or within the required 500-foot clear zone. Grounds to the south and west of this area with the potential to yield archaeological resources were evaluated in two separate field surveys in 1994-1995 and 2000 (ICRMP 2006). One historical archaeological site (33GR1032) and one prehistoric archaeological site (33GR890) were identified during the field surveys and both were determined to be ineligible for inclusion in the National Register of Historic Places. No additional archaeological field surveys were conducted within the vicinity of Alternative 3 due to pervasive ground disturbances associated with past operations of a landfill and quarry operations. The Ohio SHPO concurred with this determination based upon review of the ICRMP.

Attachment 7

Description of the Undertaking's Effect on Historic Properties

The APE boundary for each site extends to a 3000-foot radius from the center of the EOD range based upon the noise sound waves and projected sound (decibel) levels extending away from the detonation point. The noise impacts are based upon information gathered from Army and Navy assessments of military munitions operations. The results of these studies concluded that due to the low frequency sound energy produced from the detonation of small explosive charges (i.e. 5 pounds of C-4), humans outdoors do not perceive the sound levels as relatively high, but if they are indoors they become aware of the vibrations through building rattles. As with any sudden explosive noise, humans may typically react with a "jerk or jolt" reaction. The 1250-foot and 3000-foot radii on the site maps in Attachment 1 are based upon sound levels measured from a five-pound blast at Fort Lewis, Washington. The Naval Surface Weapons Laboratory, Virginia, published a noise manual which included reference sound level peaks for use in determining potential risk of complaints (see Table 3.9-1, extracted from this document, below).

In addition, Department of Defense software was utilized to perform a blast analysis of the detonation of the maximum quantity of explosive materials (5 pounds of C-4) that would be detonated inside the six-foot tall concrete containment barrier during the EOD training operations. The results of the blast analysis indicate that at 100 feet from the point of detonation there would be zero percent probability of injuries to people and that there would be no structural impacts to building beams, floors, walls, columns, or glass windows.

Listed below is the assessment of the potential effects on historic properties based upon the potential impacts from the construction and operation of the EOD range at each proposed site.

Skeel Avenue Site. This site is located on the northern boundary of the Huffman Prairie in Area C of WPAFB, just south of the Airfield Hazardous Cargo Pads. There are two historic properties within the APE. They are listed as follows with the distance from the point of detonation:

- Approximately 2450 feet to the east is the western boundary of the Brick Quarters Historic District
- Approximately 2450 feet to the southwest is the eastern boundary of the Huffman Prairie Flying Field (HPFF)

The closest historic structure/building is approximately 2450 feet away from the detonation point. Based upon the blast analysis there would be no structural impacts to any historic building, nor should there be any building rattle disturbance to residents living inside the Brick Quarters. In addition, there is zero percent probability of physical injury to visitors to the HPFF or any other personnel outside of the secured fenced-in 500-foot clear zone. Depending on where the visitor is located on the HPFF, there is a low to moderate risk of receiving complaints from the detonations based upon the noise prediction guidelines established by the Naval Weapons Service Center (Table 3.9-1, Attachment 7b). There is also a low to moderate risk of receiving complaints from the residents living in the Brick Quarters Historic District as a result of the noise produced from the detonations. With the appropriate notifications and awareness education of the EOD range operations to the Brick Quarters residents and HPFF visitors, it is our opinion

that this site has a low potential of significantly disturbing the desired visitor experience at the flying field and disrupting residential life.

Former EOD range. This site is located in Area C of WPAFB north of the intersection of Riverview and Symmes Road, approximately 400 feet east of the Mad River. There are two historic properties within the APE. They are listed as follows with the distance from the point of detonation:

- Approximately 900 feet to the west is historic archaeological site 33GR1023, which is eligible for listing on the National Register of Historic Places (NRHP). This site is referred to by nineteenth century mapping and literature as Kneisly Village, which was occupied from the mid-nineteenth century through to the construction of the Huffman Dam, in the early twentieth century. Attachment 4 contains the Ohio Archaeological Inventory (OAI) Form.
- Approximately 3000 feet to the southeast is prehistoric archaeological site 33GR918, which is eligible for listing on the NRHP. The site is a short-term, single-resource Archaic campsite.

Based upon the blast analysis there would be no structural impacts to the archaeological sites.

Hebble Creek Road Site. The proposed EOD range at this location is north of Hebble Creek Road and approximately 900 feet west of the western boundary of the HPFF. There are two historic properties within the APE. They are listed as follows with the distance from the point of detonation:

- Approximately 900 feet to the east is the western boundary of the HPFF.
- Approximately 3000 feet to the north is prehistoric archaeological site 33GR918.

Based upon the blast analysis there would be no structural impacts to the archaeological site or HPFF. In addition, there is zero percent probability of physical injury to visitors of the HPFF or any other personnel outside of the secured fenced-in 500 foot clear zone. To address concerns regarding visitor confusion regarding the type of fencing around the EOD range, it is proposed that a different fence, such as chain link fence be installed. Depending on where the visitor is located on the HPFF, there is a moderate risk of receiving complaints from the detonations based upon the noise prediction guidelines established by the Naval Weapons Service Center (Table 3.9-1, Attachment 2). It should be noted that all of the HPFF interpretive signs, structures, and walking trails are located in the 129 decibel range or the moderate risk level for receiving complaints. We recognize that this site primarily has a moderate potential of causing increased complaints from visitors to the flying field. We contend this is also subjective, based upon the visitor's perception and understanding of HPFF being located on an active military installation.

Sandhill Site. The proposed EOD range at this location is northeast of State Route 235 and east of Haddix Road. There are no known historic properties located within or adjacent to the APE.

Table 3.9-1:

Gun Noise Complaint Prediction Guidelines: Naval Surface Weapons Center (Source: Noise Manual, USACHPPM)

Predicted Sound Level, dB Peak	Risk of Complaints	Action
< 115	Low	Fire all programs
115 – 130	Moderate	Fire important tests. Postpone non-critical testing, if feasible.
130 – 140	High, possibility of damage	Only extremely important tests should be fired.
> 140	Threshold for permanent physiological damage to unprotected human ears. High risk of physiological and structural damage claims	Postpone all explosive operations.

Attachment 8

Applicability of the Criteria of Adverse Effect

It is the contention of WPAFB and consulting parties that the adverse effect resulting from the construction and operation of the proposed EOD range would be the indirect adverse effect of noise.

Noise would not adversely affect the characteristics of the archaeological sites (33GR918 and 33GR1023) that make them eligible for listing on the National Register of Historic Places. Therefore these archaeological sites are not the subject of this consultation.

Noise introduced by the proposed EOD range is considered to have an indirect adverse effect on the Brick Quarters Historic District and the Huffman Prairie Flying Field.

Brick Quarters Historic District

The proposed EOD range would have a low to moderate impact on noise levels at the western edge of the Brick Quarters Historic District. Residents of the Brick Quarters are senior officers (colonels) and general officers (generals) who typically stay in the quarters for a two-year tour of duty. Noise is a fact of life on an active military installation. The Brick Quarters is located relatively close to the active flight line and the base hospital. The views of the residents of the Brick Quarters were solicited through the public notice put in the Dayton Daily News and the Fairborn Daily Herald, and by articles run in those same papers and in the base newspaper, the Skywrighter. This latter article was also posted on the base web site (see Attachment 9 for media coverage). In addition, the proposed EOD range was briefed at the August 3, 2009 Environmental, Safety, and Occupational Health (ESOH) Council meeting, which is chaired by the installation commander and attended by many of the commanders on the base. No comments were received from the residents either from the media coverage or through the ESOH Council meeting.

Huffman Prairie Flying Field (HPFF)

The proposed EOD range is a critical mission-essential activity, needed to train EOD personnel in support of missions in Iraq and Afghanistan. Operation of the range would be another source of noise surrounding the HPFF. Due to the very short duration (less than one second) of the blasts and the relative infrequency of the training operations (at maximum, one blast per hour, three days/week, Monday – Friday), the overall visitor experience at the HPFF would not be significantly impacted. According to the National Park Service (NPS) visitation statistics for the ranger-guided tours, the majority of the visits to the HPFF are on the weekends, especially Memorial Day through Labor Day. The EOD range would not be in operation for routine training activities during the weekends, and would only be used on the weekends for emergency disposal situations.

The historic integrity of the HPFF has been maintained by WPAFB since its designation as a national park unit in 1992 and opening to the public while coexisting with nearby noise-generating activities: daily

flying of aircraft (currently C-5s), seasonal hunting, an adjacent trap and skeet range, and the former operation of the outdoor Combat Arms Training and Maintenance (CATM) Range. WPAFB has worked to minimize noise issues at HPFF. The CATM range was placed in a new indoor facility at another location on base. The trap and skeet range and HPFF share a calendar now, with HPFF closed on Wednesdays and the skeet range closed most weekends, except when there is a scheduled trap or skeet meet. These initiatives were done specifically to address noise issues at HPFF. Overall, there has been a significant reduction in noise at the site from the 1992 baseline. While the operation of the proposed EOD range would increase the background noise at a portion of HPFF, it would not be anywhere near the quantity of noise previously represented by the CATM or full operation of the trap and skeet range.

Attachment 9

Views of Consulting Parties and the Public

WPAFB Public Notice

- Apr 10, 2009 (Dayton Daily News) - 9A
- Article in Dayton Daily News Apr 9, 2009 – 9B
- Article in base newspaper (Skywriter) Apr 14, 2009 -9C

Ohio Historic Preservation Office (SHPO) (*Consulting Party*) See Attachment 2

- Oct 24, 2008 – letter from WPAFB to OHPO, stating No Adverse Effect at proposed sites
- Jan 20, 2009 – letter from OHPO requesting more information & analysis on the APE for sites
- Apr 3, 2009 – letter from WPAFB to OHPO providing requested information
- June 22, 2009 – letter from OHPO asserting adverse effect on Huffman Prairie Flying Field and Brick Quarters for Skeel Ave site and Huffman Prairie Flying Field for Hebble Creek site; requested that WPAFB work with the National Park Service regarding impacts to an NHL

NPS – Dayton Aviation Heritage National Historical Park (NPS-DAAV) (*Consulting Party*) See Attachment 3

- Oct 24, 2008 – letter to NPS – DAAV requesting comment
- Nov 7, 2008 – letter from park indicating opposition to Hebble Creek site
- May 1, 2009 – letter from park indicating opposition to Hebble Creek site and support for Skeel Ave site

NPS – Midwest Regional Office (NPS-MWRO)(*Consulting Party*) See Attachment 3

- Nov 26, 2008 – letter from NPS-MWRO, raising concerns & requesting WPAFB work with NPS-DAAV
- Oct 26, 2009 – letter from WPAFB to NPS-MWRO addressing issues relating to NHL
- Dec 4, 2009 – letter from NPS-MWRO stating indirect adverse affect to HPFF NHL, but approving use of Skeel Ave site

National Aviation Heritage Alliance (*Consulting Party*)

- Oct 24, 2008 – letter from WPAFB inviting comment - 9D
- Nov 13, 2008 – letter from NAHA - supports former EOD site and Sandhill site – 9E
- May 5, 2009 – letter from NAHA - does not support Hebble Creek site, but supports other sites – 9F
- Aug 20, 2009 – letter from NAHA - concerns with Skeel Ave site impacts on Brick Quarters; supports former EOD site – 9G

City of Fairborn

- Oct 24, 2008 – letter from WPAFB to Mayor Gary Woodward, Fairborn, inviting comment – 9H
- Nov 10, 2008 – letter from Ms. Deborah McDonnell, City Manager, Fairborn, requesting that the Sandhill site not be used, due to proximity to critical city infrastructure and residential neighborhoods - 9I

Ms. Deborah Simpson, resident of Fairborn

- Apr 21, 2009 – letter from Ms. Simpson to WPAFB in response to article in local newspaper – 9J
- Aug 17, 2009 – response from WPAFB to Ms. Simpson regarding Sandhill location – 9K

Community Correspondence



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

24 October 2008

88 ABW/CEV
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

The Honorable Gary Woodward
Mayor City of Fairborn
44 West Hebble Avenue
Fairborn OH 45324

Dear Mayor Woodward

Wright-Patterson Air Force Base (WPAFB) is preparing an environmental assessment for the proposed construction and operation of the 88 ABW/CED Explosives Ordnance Disposal (EOD) proficiency training and emergency disposal range. In accordance with Title 32, Code of Federal Regulations, Part 989, *Environmental Impact Analysis Process*, and Title 36, Code of Federal Regulations, Part 800, *Protection of Historic Properties*, WPAFB is affording you the opportunity to provide comments and/or become a consulting party with regards to this proposed undertaking. The proposed locations for the EOD range are (see Attachment 1 for maps of the proposed locations):

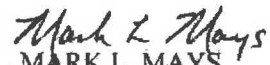
- I. Former EOD range (Area C of WPAFB)
- II. Property north of Hebble Creek Road and west of the Huffman Prairie Flying Field (Area C of WPAFB)
- III. Sand Hill (north of Area C of WPAFB)

The purpose of the EOD range is to provide Air Force required proficiency training to EOD personnel. Training at the EOD range would occur an average of 3 days/week, up to 8 hours/day. The eight hours involve setting up/training for the detonation of explosive materials (maximum explosive material detonated is five pounds C4 at one time). The actual detonation/explosion takes less than one second. The "clear" zone around the detonation site is a 500-foot radius. The detonations will be performed inside a walled containment barrier, most likely concrete. On an emergency basis only, this site will also be used to detonate unexploded ordnance that comes from the base and also from the public. This project would involve constructing a precast concrete barrier six feet tall, approximately 46 feet long x 24 feet wide, with two open entrances. Two smaller barriers (approximately 6 feet long x 6 feet wide x 4 feet high) to contain tools and explosive materials, and a gravel access road and parking area would also be constructed. The site would be fenced off. See Attachment 2 for examples of the barriers.

Please provide written comments and/or your request to become a consulting party by 10 Nov 08 to:

Ms. Estella Holmes
ASC/ENVR
1801 10th Street, Suite 2
Wright-Patterson AFB Ohio 45433-7624
1-800-982-7248 x53395

Sincerely


MARK L. MAYS
Chief, Environmental Management Division
Civil Engineer Directorate

Attachments

1. Proposed Site Locations
2. EOD Barriers

**WRIGHT-PATTERSON AIR FORCE BASE
ENVIRONMENTAL MANAGEMENT DIVISION
ACCEPTING PUBLIC COMMENTS ON THE
DRAFT ENVIRONMENTAL ASSESSMENT TO CONSTRUCT AN
EXPLOSIVES ORDNANCE DISPOSAL PROFICIENCY TRAINING AND
EMERGENCY DISPOSAL RANGE**

From April 10 through May 10, 2009, Wright-Patterson Air Force Base (WPAFB) officials will accept comments on the draft Environmental Assessment (EA) and the draft Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI/FONPA) for the construction and operation of an Explosives Ordnance Disposal (EOD) Proficiency Training and Emergency Disposal Range in Area C of WPAFB. Both the draft EA and FONSI/FONPA were prepared in accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality implementing NEPA.

The proposed action is to construct and operate an EOD Proficiency Training and Emergency Disposal Range. The purpose of the EOD range is to provide Air Force required proficiency training to EOD personnel. Training at the EOD range would occur an average of 3 days/week, up to 8 hours/day. The eight hours involve setting up/training for the detonation of explosive materials (maximum explosive material detonated is five pounds of C-4 at one time). The maximum number of detonations that would occur in a training day is one per hour or a total of eight. The actual detonation/explosion takes less than one second. The "clear" zone around the detonation site is a 500-foot radius, secured by a fence. On an emergency basis only, this site will also be used to detonate unexploded ordnance that comes from the base and also from the public. The detonations will be performed inside a six-foot tall concrete walled containment barrier.

The EA assesses the following four locations, plus the No Action Alternative:

Proposed Action: Skeel Avenue Site. This site is located on the northern boundary of the Huffman Prairie in Area C of WPAFB, just south of the Airfield Hazardous Cargo Pads.

Alternative 1: Former EOD Range. This site is located in Area C of WPAFB north of the intersection of Riverview and Symmes Road, approximately 400 feet east of the Mad River.

Alternative 2: Hebble Creek Road Site. This site is located in Area C of WPAFB north of Hebble Creek Road and approximately 900 feet west of the western boundary of the Huffman Prairie Flying Field.

Alternative 3: Sandhill Site. This site is located northeast of State Route 235 (Chambersburg Road) and east of Haddix Road.

The public is invited to review the documents at the Paul Laurence Dunbar Library, Wright State University, 3640 Colonel Glenn Highway, Dayton, Ohio 45435.

Written comments and inquiries on the draft EA and FONSI/FONPA should be directed to:

Mr. Raymond Baker
88 ABW/CEVY
1450 Littrell Road
Wright-Patterson AFB Ohio 45433-5209
(937) 257-0177

EOD EA Public Notice Mailing List

The Honorable Gary Woodward
Mayor City of Fairborn
44 West Hebble Avenue
Fairborn OH 45324

Tony Sculimbrene
Executive Director
National Aviation Heritage Alliance
P.O. Box 414
Dayton OH 45409

Mr. Dean Alexander
Superintendent
Dayton Aviation Heritage National Historical Park
P.O. Box 9280
Wright Brothers Station
Dayton OH 45409

Mr. Johnathan L. Buffalo
Historical Preservation Director/NAGPRA Rep
Sac and Fox of the Mississippi in Iowa
349 Meskwaki Road
Tama IA 52339-9634

Ms. Summer Sky Cohen, Officer
Tribal Historic Preservation Office
Keweenaw Bay Indian Community
16429 Beartown Road
Baraga MI 49908

Mr. William Johnson
The Saginaw Chippewa Indian Tribe
6650 East Broadway
Mt Pleasant MI 48858

United Keetoowah Band of Cherokee Indians in Oklahoma
Attn: Lisa Stopp
P.O. Box 746
Tahlequah OK 74465

April 21, 2008

*Rec'd 27 Apr 09
R. Baker*
Mr. Raymond Baker
88th Air Base Wing/ CEVY
1450 Littrell Rd.
Wright Patterson AFB, OH 45433-5209

Dear Mr. Baker,

I grew up in Fairborn and after spending much of my adult life working in other states, my husband and I moved back here in August of 07 to assist with my aging mother and plan to retire here. We reside in the Peebles Estate division, up by the Presbyterian & Baptist churches. This neighborhood, has always endured the noise level from planes flying from the old SAC area, sometimes shaking the walls. It is as much a part of what this neighborhood is all about as is the friendliness of the neighbors themselves. It is a reminder that we are in a military protected city and for me personally, my father was a major at Wright Patt until his retirement.

The expansion taking place is a positive move and all of us share in the excitement of growth at the base and all it represents for Greene county. Housing sales, hotels filling up, and the growth of business surrounding the area.

My reason for this letter is to say that I am concerned, in fact the neighborhood, is concerned and reacting to the article in Fairborn's paper of April 9th about WP adding an explosive's training site, and even thinking about using the Sandhill location is unacceptable to all of us. I don't know what 5 lbs of C-4 would feel like or sound like but for us, who endure the sound levels of C-16 cargo planes and military fighter jets on a daily basis, sometimes nightly, additional rumblings and loud noises is too much to ask for from us. This is a primarily older residential neighborhood, not one where my neighbors are as able to go to council meetings and demand they be heard so I hope my letter will speak loudly enough for all of them as well as myself.

I'm concerned about what will happen to the environment of growth in the area if new people coming to Ohio know they will live near explosives? I know I wouldn't personally want a home near one! I know the people of Peebles Estates are looking forward to peaceful retirement, and of homes being able to sell with our new military and civilians moving to town and we don't want to have to worry about what explosives would put into the environment, what the sound level would be this close to us, what the traffic levels would change to, etc.

I've read articles about the C4 explosives and understand that the containers themselves are not environmentally friendly and therefore, clean up of an area would cost millions of dollars when the military is through with it, and residue can sift through the ground and into water sources. Sandhill area is right next to the river!

Mr. Baker, I think it fair to say we universally disapprove of this new site being anywhere near Sandhill Rd. If I need to get names and petitions for you in order to Further make our wishes known, Please let me know and I'll go door to door.

This is my home, my city, my neighbors and my life we are talking about.

Respectfully,
Deborah Simpson
1231 Overlook Drive
Fairborn, Ohio 45324
(937) 318-1092

A handwritten signature in cursive script, reading "Deborah Simpson". The signature is written in black ink and is positioned to the right of the typed name and address.



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

17 August 2009

88 ABW/CEVY
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

Ms. Deborah Simpson
1231 Overlook Drive
Fairborn OH 45324

Dear Ms. Simpson

Thank you for your letter which we received on April 27, 2009 expressing your concerns regarding Wright-Patterson Air Force Base's proposal to locate an explosives ordnance disposal training range at the base. First, please accept my apology for our delayed response to your letter. Secondly, we certainly appreciate your support of the base and the concern you have with the future condition and safety of your neighborhood.

You expressed specific concerns regarding potential impacts to your neighborhood if the range were located at the Sandhill location. Please be assured these issues, among many others, are being considered for each of the four proposed sites in the environmental assessment. Of note, the Sandhill location is the least preferred site out of the four proposed locations. The Air Force's preferred site is the Hebble Creek Road Site which is located well within Area C of the base, and over 3.5 miles from your neighborhood.

Thanks again for expressing your concerns. Should you have any additional concerns or questions, please don't hesitate to contact me at (937) 257-0177, or via e-mail at raymond.baker@wpafb.af.mil.

Sincerely

RAYMOND F. BAKER
Chief, Quality Branch
Environmental Management Division

cc:
88 ABW/PA
Deborah McDonnell, Fairborn City Manager

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APPENDIX B

SAMPLING AND ANALYSIS PLAN

In order to provide an unbiased soil sample location for the second of the two samples, the circles will be overlain with a 50' grid that divides the 300' circle into 36 individual numbered sectors identified as #1 through #36. A random number generator will be used to identify the grid sectors to be sampled. Grid sectors that contain a portion of the detonation pad will be excluded from the selection process in order to provide aerial distance from the first sample location. This will increase the possibility of collecting samples that represent both the detonation pad and exclusion zone.

Utilizing a hand held GPS, field personnel will identify the approximate center of the proposed 88 AWB/CED/EOD training and disposal facility. A soil sample will be collected within 20' of the center. From the center, CTI personnel will locate the center of the randomly selected grid sector in the exclusion zone and collect the soil sample from that point. If the center of the grid section is outside of the 300' diameter circle, a location within both the grid sector and the 300' circle will be sampled.

SAMPLE COLLECTION AND HANDLING

Once the specific soil sampling location has been identified, CTI personnel will use a coring device for soil sample collection. Disposable nitrile gloves are to be worn during the sample collection process.

The coring device will be pushed into the soil to a depth of 6" and withdrawn. The soil collected in the tube is to be placed directly into a labeled, laboratory supplied sample container. If the sample volume collected in the corer is insufficient to fill the jar completely, more than one coring operation will be performed.

Upon completion of the sample collection operation, the sealed and labeled jar will be placed in a plastic bag and into a cooler containing ice. Upon completion of the sample event, the cooler will then be shipped to Belmont Laboratory under appropriate chain of custody.

A duplicate sample will be collected from a location selected by the CTI field personnel.

APPENDIX C

LABORATORY DATA; HEBBLE CREEK SITE / SANDHILL / SKEEL AVENUE

BELMONT LABORATORIES
LEVEL IV DATA PACKAGE

Work Order # 08-09-332

Prepared for

Chandrashekar Koganti
CTI and Associates, Inc.
12482 Emerson Drive
Brighton, MI 48116

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Friday, September 12, 2008

Chandrashekar Koganti
CTI and Associates, Inc
12482 Emerson Drive
Brighton, MI 48116
TEL: (248) 264-4015
FAX

RE: WPAFB

Order No.: 0809332

Dear Chandrashekar Koganti:

Belmont Labs received 2 sample(s) on 9/5/2008 for the analyses presented in the following report.

Belmont Labs attests that all analytical methods were performed using acceptable methods, and that the QA/QC procedures stipulated in these methods were followed. USEPA's RCRA Program regards a statement of quality assurance as a legal means of assuring that acceptable and uniform laboratory methods and QA/QC practices were followed by the laboratory. Unless otherwise noted, all methods contained within this report are NELAC/NELAP certified.

NELAC/NELAP Cert. # 04130

If you have any questions regarding the test results, please feel free to call me at 937.832.8242.

Respectfully submitted,

Holly Green

Project Manager

QC LEVEL: LEVEL IV

000001

Belmont Labs

Date: 12-Sep-08

CLIENT: CTI and Associates, Inc
Project: WPAFB**Lab Order:** 0809332**Lab ID:** 0809332-001**Collection Date:** 9/5/2008 2:30:00 PM**Client Sample ID:** SH-1**Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY, TOTAL		SW7471				Analyst: KC
Mercury	BDL	0.14		mg/Kg-dry	1	9/12/2008
PERCENT MOISTURE		D2216				Analyst: ad
Percent Moisture	24.4			wt%	1	9/8/2008
ICP METALS, TOTAL		SW6010B				Analyst: KC
Silver	BDL	1.20		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Aluminum	1380	6.01		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Arsenic	BDL	1.20		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Barium	116	6.01		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Beryllium	BDL	0.601		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Calcium	234000	120		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Cadmium	BDL	1.20		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Cobalt	BDL	1.20		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Chromium	2.69	1.20		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Copper	4.46	1.20		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Iron	1350	6.01		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Potassium	708	120		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Magnesium	3260	120		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Manganese	63.1	1.20		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Sodium	23000	481		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Nickel	1.46	1.20		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Lead	BDL	6.01		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Antimony	BDL	6.01		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Selenium	BDL	6.01		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Thallium	BDL	6.01		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Vanadium	1.59	1.20		mg/Kg-dry	1	9/12/2008 11:49:56 AM
Zinc	8.60	6.01		mg/Kg-dry	1	9/12/2008 11:49:56 AM

000002

Belmont Labs

Date: 12-Sep-08

CLIENT: CTI and Associates, Inc
Project: WPAFB

Lab Order: 0809332

Lab ID: 0809332-002

Collection Date: 9/5/2008 2:40:00 PM

Client Sample ID: SH-2

Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
MERCURY, TOTAL		SW7471				Analyst: KC
Mercury	BDL	0.12		mg/Kg-dry	1	9/12/2008
PERCENT MOISTURE		D2216				Analyst: ad
Percent Moisture	21.5			wt%	1	9/8/2008
ICP METALS, TOTAL		SW6010B				Analyst: KC
Silver	BDL	1.16		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Aluminum	5140	5.79		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Arsenic	2.55	1.16		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Barium	105	5.79		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Beryllium	BDL	0.579		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Calcium	164000	116		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Cadmium	BDL	1.16		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Cobalt	1.85	1.16		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Chromium	6.82	1.16		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Copper	6.66	1.16		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Iron	5830	5.79		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Potassium	1640	116		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Magnesium	6240	116		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Manganese	107	1.16		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Sodium	16800	463		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Nickel	4.58	1.16		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Lead	15.5	5.79		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Antimony	BDL	5.79		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Selenium	BDL	5.79		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Thallium	BDL	5.79		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Vanadium	8.08	1.16		mg/Kg-dry	1	9/12/2008 11:55:19 AM
Zinc	27.8	5.79		mg/Kg-dry	1	9/12/2008 11:55:19 AM

000003

Belmont Labs

Date: 12-Sep-08

CLIENT: CTI and Associates, Inc
Project: WPAFB**Lab Order:** 0809332**Data Qualifiers (Flags)**

- * Value exceeds Maximum Contaminant Level
- B Analyte detected in the associated Method Blank
- BDL Below Detection limit
- C Sample result confirmed
- E Value above quantitation range
- F Unable to obtain a reliable result due to matrix interference
- H Analysis completed outside holding times
- J Analyte detected below quantitation limits, estimated concentration for TICs
- K Result from method of standard additions
- N Presumptive evidence of analyte present
- P Percent difference between primary and secondary column concentrations exceeded acceptance limit
- PQL Practical Quantitation Limit or surrogate
- S Surrogate recovery outside acceptance limits
- V Calibration criteria exceeded, but acceptable by method

000004

CLIENT: CTI and Associates, Inc

Work Order: 0809332

Project: WPAFB

ANALYTICAL QC SUMMARY REPORT

TestCode: HG_S

Sample ID: MB-18704	SampType: MBLK	TestCode: HG_S	Units: mg/Kg	Prep Date: 9/12/2008	RunNo: 74863						
Client ID: ZZZZZ	Batch ID: 18704	TestNo: SW7471		Analysis Date: 9/12/2008	SeqNo: 995938						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury	BDL	0.10									
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Sample ID: LCS-18704	SampType: LCS	TestCode: HG_S	Units: mg/Kg	Prep Date: 9/12/2008	RunNo: 74863						
Client ID: ZZZZZ	Batch ID: 18704	TestNo: SW7471		Analysis Date: 9/12/2008	SeqNo: 995939						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury	0.7800	0.10	0.835	0	93.4	80	120	0	0		
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Sample ID: LCSD-18704	SampType: LCSD	TestCode: HG_S	Units: mg/Kg	Prep Date: 9/12/2008	RunNo: 74863						
Client ID: ZZZZZ	Batch ID: 18704	TestNo: SW7471		Analysis Date: 9/12/2008	SeqNo: 995948						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury	0.7933	0.10	0.835	0	95	80	120	0.78	1.69	20	
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Sample ID: 0809313-001A MS	SampType: MS	TestCode: HG_S	Units: mg/Kg-dry	Prep Date: 9/12/2008	RunNo: 74863						
Client ID: ZZZZZ	Batch ID: 18704	TestNo: SW7471		Analysis Date: 9/12/2008	SeqNo: 995941						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury	1.032	0.14	1.134	0.131	79.5	70	130	0	0		
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Sample ID: 0809313-001A MSD	SampType: MSD	TestCode: HG_S	Units: mg/Kg-dry	Prep Date: 9/12/2008	RunNo: 74863						
Client ID: ZZZZZ	Batch ID: 18704	TestNo: SW7471		Analysis Date: 9/12/2008	SeqNo: 995942						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury	1.031	0.14	1.153	0.131	78.1	70	130	1.032	0.117	30	
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CLIENT: CTI and Associates, Inc
 Work Order: 0809332
 Project: WPAFB

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_SOIL

Sample ID: MB-18700	SampType: MBLK	TestCode: ICP_SOIL	Units: mg/Kg	Prep Date: 9/12/2008	RunNo: 74854						
Client ID: ZZZZZ	Batch ID: 18700	TestNo: SW6010B	(SW3050A)	Analysis Date: 9/12/2008	SeqNo: 995774						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Silver	BDL	1.00									
Aluminum	BDL	5.00									
Arsenic	BDL	1.00									
Barium	BDL	5.00									
Beryllium	BDL	0.500									
Calcium	BDL	100									
Cadmium	BDL	1.00									
Cobalt	BDL	1.00									
Chromium	BDL	1.00									
Copper	BDL	1.00									
Iron	BDL	5.00									
Potassium	BDL	100									
Magnesium	BDL	100									
Manganese	BDL	1.00									
Sodium	BDL	400									
Nickel	BDL	1.00									
Lead	BDL	5.00									
Antimony	BDL	5.00									
Selenium	BDL	5.00									
Thallium	BDL	5.00									
Vanadium	BDL	1.00									
Zinc	BDL	5.00									

Sample ID: LCS-18700	SampType: LCS	TestCode: ICP_SOIL	Units: mg/Kg	Prep Date: 9/12/2008	RunNo: 74854						
Client ID: ZZZZZ	Batch ID: 18700	TestNo: SW6010B	(SW3050A)	Analysis Date: 9/12/2008	SeqNo: 995775						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Silver	91.30	1.00	100	0	91.3	80	120	0	0		
Aluminum	95.70	5.00	100	0	95.7	80	120	0	0		
Arsenic	96.30	1.00	100	0	96.3	80	120	0	0		
Barium	91.00	5.00	100	0.353	90.6	80	120	0	0		

CLIENT: CTI and Associates, Inc

Work Order: 0809332

Project: WPAFB

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_SOIL

Sample ID: LCS-18700	SampType: LCS	TestCode: ICP_SOIL	Units: mg/Kg	Prep Date: 9/12/2008	RunNo: 74854						
Client ID: ZZZZZ	Batch ID: 18700	TestNo: SW6010B	(SW3050A)	Analysis Date: 9/12/2008	SeqNo: 995775						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Beryllium	91.20	0.500	100	0	91.2	80	120	0	0		
Calcium	4380	100	5100	0	85.9	80	120	0	0		
Cadmium	96.40	1.00	100	0	96.4	80	120	0	0		
Cobalt	90.80	1.00	100	0	90.8	80	120	0	0		
Chromium	90.20	1.00	100	0	90.2	80	120	0	0		
Copper	88.30	1.00	100	0	88.3	80	120	0	0		
Iron	95.10	5.00	100	0	95.1	80	120	0	0		
Potassium	6120	100	6000	0	102	80	120	0	0		
Magnesium	5030	100	5100	0	98.6	80	120	0	0		
Manganese	92.90	1.00	100	0	92.9	80	120	0	0		
Sodium	5900	400	5100	0	116	80	120	0	0		
Nickel	91.00	1.00	100	0	91	80	120	0	0		
Lead	95.20	5.00	100	0	95.2	80	120	0	0		
Antimony	92.90	5.00	100	0	92.9	80	120	0	0		
Selenium	99.80	5.00	100	0	99.8	80	120	0	0		
Thallium	88.60	5.00	100	0	88.6	80	120	0	0		
Vanadium	90.90	1.00	100	0	90.9	80	120	0	0		
Zinc	93.30	5.00	100	0	93.3	80	120	0	0		

Sample ID: LCSD-18700	SampType: LCSD	TestCode: ICP_SOIL	Units: mg/Kg	Prep Date: 9/12/2008	RunNo: 74854						
Client ID: ZZZZZ	Batch ID: 18700	TestNo: SW6010B	(SW3050A)	Analysis Date: 9/12/2008	SeqNo: 995776						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Silver	91.70	1.00	100	0	91.7	80	120	91.3	0.437	20	
Aluminum	96.20	5.00	100	0	96.2	80	120	95.7	0.521	20	
Arsenic	96.40	1.00	100	0	96.4	80	120	96.3	0.104	20	
Barium	91.20	5.00	100	0.353	90.8	80	120	91	0.220	20	
Beryllium	91.30	0.500	100	0	91.3	80	120	91.2	0.110	20	
Calcium	4400	100	5100	0	86.3	80	120	4380	0.456	20	
Cadmium	96.50	1.00	100	0	96.5	80	120	96.4	0.104	20	
Cobalt	91.00	1.00	100	0	91	80	120	90.8	0.220	20	

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CLIENT: CTI and Associates, Inc
 Work Order: 0809332
 Project: WPAFB

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_SOIL

Sample ID: LCSD-18700	SampType: LCSD	TestCode: ICP_SOIL	Units: mg/Kg	Prep Date: 9/12/2008	RunNo: 74854						
Client ID: ZZZZZ	Batch ID: 18700	TestNo: SW6010B	(SW3050A)	Analysis Date: 9/12/2008	SeqNo: 995776						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	90.30	1.00	100	0	90.3	80	120	90.2	0.111	20	
Copper	88.50	1.00	100	0	88.5	80	120	88.3	0.226	20	
Iron	94.90	5.00	100	0	94.9	80	120	95.1	0.211	20	
Potassium	6140	100	6000	0	102	80	120	6120	0.326	20	
Magnesium	5060	100	5100	0	99.2	80	120	5030	0.595	20	
Manganese	92.90	1.00	100	0	92.9	80	120	92.9	0	20	
Sodium	5890	400	5100	0	115	80	120	5900	0.170	20	
Nickel	91.00	1.00	100	0	91	80	120	91	0	20	
Lead	95.30	5.00	100	0	95.3	80	120	95.2	0.105	20	
Antimony	92.60	5.00	100	0	92.6	80	120	92.9	0.323	20	
Selenium	100.0	5.00	100	0	100	80	120	99.8	0.200	20	
Thallium	89.30	5.00	100	0	89.3	80	120	88.6	0.787	20	
Vanadium	91.00	1.00	100	0	91	80	120	90.9	0.110	20	
Zinc	93.40	5.00	100	0	93.4	80	120	93.3	0.107	20	

Sample ID: 0809313-001A MS	SampType: MS	TestCode: ICP_SOIL	Units: mg/Kg-dry	Prep Date: 9/12/2008	RunNo: 74854						
Client ID: ZZZZZ	Batch ID: 18700	TestNo: SW6010B	(SW3050A)	Analysis Date: 9/12/2008	SeqNo: 995778						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Silver	126.7	1.44	143.8	0	88.1	75	125	0	0		
Aluminum	10840	7.19	143.8	9831	703	75	125	0	0		M
Arsenic	165.3	1.44	143.8	32.21	92.6	75	125	0	0		
Barium	376.7	7.19	143.8	262.3	79.6	75	125	0	0		
Beryllium	126.5	0.719	143.8	0.7193	87.5	75	125	0	0		
Calcium	17970	144	7333	12360	76.5	75	125	0	0		
Cadmium	132.3	1.44	143.8	1.451	91	75	125	0	0		
Cobalt	130.8	1.44	143.8	5.659	87.1	75	125	0	0		
Chromium	137.3	1.44	143.8	12.74	86.6	75	125	0	0		
Copper	149.5	1.44	143.8	26.23	85.8	75	125	0	0		
Iron	24590	7.19	143.8	24690	-73.3	75	125	0	0		M
Potassium	10210	144	8627	1368	102	75	125	0	0		

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CLIENT: CTI and Associates, Inc

Work Order: 0809332

Project: WPAFB

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_SOIL

Sample ID: 0809313-001A MS	SampType: MS	TestCode: ICP_SOIL	Units: mg/Kg-dry	Prep Date: 9/12/2008	RunNo: 74854						
Client ID: ZZZZZ	Batch ID: 18700	TestNo: SW6010B	(SW3050A)	Analysis Date: 9/12/2008	SeqNo: 995778						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Magnesium	9072	144	7333	2193	93.8	75	125	0	0		
Manganese	513.3	1.44	143.8	394.1	82.9	75	125	0	0		
Sodium	9317	575	7333	1069	112	75	125	0	0		
Nickel	139.5	1.44	143.8	15.34	86.3	75	125	0	0		
Lead	162.5	7.19	143.8	38.34	86.3	75	125	0	0		
Antimony	120.6	7.19	143.8	1.656	82.7	75	125	0	0		
Selenium	137.9	7.19	143.8	2.132	94.4	75	125	0	0		
Thallium	115.7	7.19	143.8	0	80.5	75	125	0	0		
Vanadium	152.4	1.44	143.8	25	88.6	75	125	0	0		
Zinc	192.7	7.19	143.8	64.72	89	75	125	0	0		

Sample ID: 0809313-001A MSD	SampType: MSD	TestCode: ICP_SOIL	Units: mg/Kg-dry	Prep Date: 9/12/2008	RunNo: 74854						
Client ID: ZZZZZ	Batch ID: 18700	TestNo: SW6010B	(SW3050A)	Analysis Date: 9/12/2008	SeqNo: 995779						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Silver	123.5	1.41	140.8	0	87.7	75	125	126.7	2.52	20	
Aluminum	10450	7.04	140.8	9831	440	75	125	10840	3.67	20	M
Arsenic	160.6	1.41	140.8	32.21	91.1	75	125	165.3	2.94	20	
Barium	369.0	7.04	140.8	262.3	75.8	75	125	376.7	2.06	20	
Beryllium	123.7	0.704	140.8	0.7193	87.3	75	125	126.5	2.29	20	
Calcium	17750	141	7183	12360	75	75	125	17970	1.27	20	M
Cadmium	129.3	1.41	140.8	1.451	90.8	75	125	132.3	2.28	20	
Cobalt	127.7	1.41	140.8	5.659	86.7	75	125	130.8	2.39	20	
Chromium	134.4	1.41	140.8	12.74	86.4	75	125	137.3	2.17	20	
Copper	146.5	1.41	140.8	26.23	85.4	75	125	149.5	2.06	20	
Iron	24230	7.04	140.8	24690	-331	75	125	24590	1.48	20	M
Potassium	9958	141	8451	1368	102	75	125	10210	2.49	20	
Magnesium	8887	141	7183	2193	93.2	75	125	9072	2.06	20	
Manganese	487.3	1.41	140.8	394.1	66.2	75	125	513.3	5.19	20	M
Sodium	9113	563	7183	1069	112	75	125	9317	2.22	20	
Nickel	135.9	1.41	140.8	15.34	85.6	75	125	139.5	2.58	20	

000010

Belmont Labs

Date: 12-Sep-08

CLIENT: CTI and Associates, Inc
 Work Order: 0809332
 Project: WPAFB

ANALYTICAL QC SUMMARY REPORT

TestCode: ICP_SOIL

Sample ID: 0809313-001A MSD		SampType: MSD		TestCode: ICP_SOIL		Units: mg/Kg-dry		Prep Date: 9/12/2008		RunNo: 74854	
Client ID: ZZZZ		Batch ID: 18700		TestNo: SW6010B		(SW3050A)		Analysis Date: 9/12/2008		SeqNo: 995779	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	157.7	7.04	140.8	38.34	84.8	75	125	162.5	2.95	20	
Antimony	117.7	7.04	140.8	1.656	82.4	75	125	120.6	2.42	20	
Selenium	135.2	7.04	140.8	2.132	94.5	75	125	137.9	1.96	20	
Thallium	113.5	7.04	140.8	0	80.6	75	125	115.7	1.94	20	
Vanadium	149.3	1.41	140.8	25	88.3	75	125	152.4	2.06	20	
Zinc	188.7	7.04	140.8	64.72	88	75	125	192.7	2.06	20	

000011

Data Qualifiers (Flags)

B	Analyte detected in the associated Method Blank
BDL	Below Detection limit
E	Value above quantitation range
F	Unable to obtain a reliable result due to matrix interference
H	Analysis completed outside holding times
J	Analyte detected below quantitation limits, estimated concentration for TICs
L	Laboratory control sample recovery outside acceptance limits
M	Matrix spike and/or matrix spike duplicate recovery outside acceptance limits
N	Presumptive evidence of analyte present
R	RPD outside accepted recovery limits
S	Surrogate recovery outside acceptance limits
V	Calibration criteria exceeded, but acceptable by method

Metals Prep

[illegible]

Final Volume is 50 ml unless noted otherwise

000013

CET-4C Hg Analysis Report

Analyst: jeffie

Worksheet file: C:\data\091208-1.wsz

Date Started: 9/12/2008 11:51:14 AM

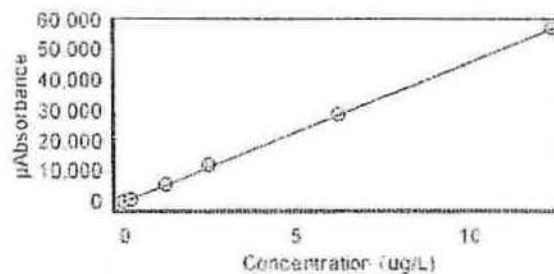
Comment:

Results

Sample Name	Type	Date/Time	Conc (ug/L)	uAbs	WL	Vol
CalibrationBlank	STD	09/12/08 11:57:15 am	0.000000	173	1.00	1.00
0.20 ug/L	STD	09/12/08 11:59:21 am	0.200000	1091	1.00	1.00
1.25 ug/L	STD	09/12/08 12:01:27 pm	1.250000	6136	1.00	1.00
2.50 ug/L	STD	09/12/08 12:03:34 pm	2.500000	12074	1.00	1.00
6.25 ug/L	STD	09/12/08 12:05:41 pm	6.250000	28384	1.00	1.00
5 ug/L	STD	09/12/08 12:07:46 pm	12.500000	57229	1.00	1.00

Calibration

Equation: $A = 280.110 + 4554.886C$
R2: 0.99966
SEE: 290.9586
Flags:



ICV	ICV	09/12/08 12:09:57 pm	5.870000	27025	1.00	1.00
% Recovery						93.95
ICE	ICE	09/12/08 12:12:05 pm	-0.028400	151	1.00	1.00
MB-18704	UNK	09/12/08 12:14:11 pm	0.003060	294	1.00	1.00
LCS-18704	UNK	09/12/08 12:16:16 pm	11.700000	53775	1.00	1.00

Sample Name	Type	Date/Time	Conc (ng/L)	uAbs	Wt	Vol
LCSD-18704	UNK	09/12/08 12:18:25 pm	11.900000	54576	1.00	1.00
313-01	UNK	09/12/08 12:20:32 pm	1.400000	6646	1.00	1.00
313-01 MS	UNK	09/12/08 12:22:39 pm	11.400000	52324	1.00	1.00
313-01 MSD	UNK	09/12/08 12:24:45 pm	11.200000	51375	1.00	1.00
313-02	UNK	09/12/08 12:26:53 pm	1.210000	5799	1.00	1.00
313-03	UNK	09/12/08 12:29:00 pm	1.130000	5656	1.00	1.00
322-01	UNK	09/12/08 12:31:07 pm	2.190000	10235	1.00	1.00
322-01	UNK	09/12/08 12:33:15 pm	0.119000	821	1.00	1.00
CCV % Recovery 101.52	CCV	09/12/08 12:35:25 pm	6.350000	29181	1.00	1.00
1B	ICB	09/12/08 12:37:33 pm	-0.030600	141	1.00	1.00
432-02	UNK	09/12/08 12:39:40 pm	0.330000	1765	1.00	1.00
MS-18706	UNK	09/12/08 12:41:47 pm	-0.002300	270	1.00	1.00
LCSD-18705	UNK	09/12/08 12:43:55 pm	5.470000	25174	1.00	1.00
LCSD-18705	UNK	09/12/08 12:46:03 pm	4.940000	22770	1.00	1.00
TCLP0910	UNK	09/12/08 12:48:11 pm	-0.055300	26	1.00	1.00
TCLP 0910 MS	UNK	09/12/08 12:50:18 pm	5.500000	25335	1.00	1.00
TCLP 0910 MSD	UNK	09/12/08 12:52:26 pm	5.340000	24584	1.00	1.00

000015

Sample Name	Type	Date/Time	Conc (ug/L)	uAbs	Wt	Vol
-01	UNK	09/12/08 12:54:34 pm	-0.049600	54	1.00	1.00
427-01	UNK	09/12/08 12:56:42 pm	-0.057900	16	1.00	1.00
427-02	UNK	09/12/08 12:58:50 pm	-0.026800	158	1.00	1.00
CCV	CCV	09/12/08 01:01:00 pm	6.240000	26690	1.00	1.00
%Recovery		99.80				
ICB	ICB	09/12/08 01:03:08 pm	-0.032100	134	1.00	1.00
440-01	UNK	09/12/08 01:05:16 pm	-0.039200	101	1.00	1.00
483-01	UNK	09/12/08 01:07:24 pm	-0.067400	-27	1.00	1.00
485-02	UNK	09/12/08 01:09:32 pm	-0.067500	-27	1.00	1.00
550-01	UNK	09/12/08 01:11:40 pm	-0.049100	56	1.00	1.00
F50-02	UNK	09/12/08 01:13:49 pm	-0.047300	65	1.00	1.00
F59-01	UNK	09/12/08 01:15:57 pm	-0.077200	-71	1.00	1.00
341-01	UNK	09/12/08 01:18:06 pm	-0.031400	137	1.00	1.00
342-01	UNK	09/12/08 01:20:14 pm	0.095000	713	1.00	1.00
345-01	UNK	09/12/08 01:22:23 pm	-0.045300	74	1.00	1.00
352-04	UNK	09/12/08 01:24:32 pm	3.040000	14106	1.00	1.00
CCV	CCV	09/12/08 01:26:42 pm	6.170000	26368	1.00	1.00
%Recovery		98.67				
ICB	ICB	09/12/08 01:28:50 pm	-0.030100	143	1.00	1.00

Sample Name	Type	Date/Time	Conc (ug/L)	µAbs	Vol	Ref
352-05	UNK	09/12/08 01:30:58 pm	4.030000	18624	1.00	1.00
352-06	UNK	09/12/08 01:33:07 pm	1.230000	5901	1.00	1.00
364-01	UNK	09/12/08 01:35:16 pm	-0.061900	-2	1.00	1.00
450-01	UNK	09/12/08 01:37:25 pm	-0.041800	90	1.00	1.00
523-05	UNK	09/12/08 01:39:34 pm	-0.060000	52	1.00	1.00
CCV	CCV	09/12/08 01:41:43 pm	6.330000	29091	1.00	1.00
%Recovery		101.21				
ICE	ICE	09/12/08 01:43:52 pm	-0.031500	136	1.00	1.00

091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 1:22:31 PM

Blank (Blk)		9/12/2008, 9:53:39 AM		Rack 0, Tube 1	
Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
Ag 328.068	0.00000	ppm	7.945	23.2	-34.3
Al 308.215	0.00000	ppm	3.076	1.4	225
As 188.980	0.00000	ppm	3.418	50.5	6.77
Au 267.594	0.00000	ppm	1.435	4.4	32.8
B 249.678	0.00000	ppm	2.302	1.4	159
Ba 413.064	0.00000	ppm	7.929	7.3	109
Be 313.042	0.00000	ppm	11.746	4.7	251
Bi 223.061	0.00000	ppm	2.819	22.1	12.7
Ca 370.602	0.00000	ppm	5.518	3.5	156
Cd 214.439	0.00000	ppm	3.603	39.0	9.25
Co 228.615	0.00000	ppm	5.383	9.1	59.1
Cr 267.716	0.00000	ppm	3.789	38.7	9.80
Cu 327.395	0.00000	ppm	4.766	12.1	39.3
Fe 259.940	0.00000	ppm	14.211	6.4	221
Hg 184.887	0.00000	ppm	0.507	7.7	6.60
K 769.897	0.00000	ppm	69.168	0.8	8264
Li 670.783	0.00000	ppm	12.590	1.9	650
Mg 279.800	0.00000	ppm	1.912	6.1	31.6
Mn 257.610	0.00000	ppm	4.935	3.2	153
Mo 202.032	0.00000	ppm	3.688	9.7	38.2
Na 568.821	0.00000	ppm	26.743	20.5	130
Ni 231.604	0.00000	ppm	3.785	52.0	-7.28
P 213.618	0.00000	ppm	2.341	9.5	24.6
Pb 220.353	0.00000	ppm	2.356	19.9	11.8
Pd 340.458	0.00000	ppm	9.388	24.7	38.0
Pt 306.471	0.00000	ppm	8.462	51.2	16.5
Sb 206.834	0.00000	ppm	0.592	11.9	4.96
Se 196.026	0.00000	ppm	2.299	27.1	8.48
Si 251.611	0.00000	ppm	2.226	3.7	60.2
Sn 189.925	0.00000	ppm	0.568	7.7	7.40
Sr 216.596	0.00000	ppm	3.783	46.5	8.13
Ti 334.941	0.00000	ppm	8.721	8.5	103
Tl 190.794	0.00000	ppm	1.161	11.1	10.5
V 311.837	0.00000	ppm	9.557	23.2	41.2
Zn 213.857	0.00000	ppm	1.003	0.4	278

Standard 1 (Std)		9/12/2008, 9:56:15 AM		Rack 0, Tube 2	
Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
Ag 328.068	2.00	ppm	138.134	0.2	70669
Al 308.215	2.00	ppm	19.139	0.2	8185
As 188.980	2.00	ppm	7.487	0.2	4648
Au 267.594	2.00	ppm	913.789	7.4	12419
B 249.678	2.00	ppm	533.657	2.6	20599
Ba 413.064	2.00	ppm	40.246	0.2	19398
Be 313.042	2.00	ppm	4103.622	0.1	3666736
Bi 223.061	2.00	ppm	50.893	0.1	59892
Ca 370.602	2.00	ppm	11.080	0.1	8264
Cd 214.439	2.00	ppm	675.815	0.6	106546
Co 228.615	2.00	ppm	62.105	0.1	44744

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Metals Prep

Date	Workorder#	Samp Wt Vol g ml	Original pH	Adjusted pH	Start Time	Stop Time	Analysis	Batch ID	Comments
	310-08	50	1					18697	
	380-01	↓	1						
	384-01	↓	1						
	428-01	↓	1						
	429-01	↓	1						
9/10/08	MB				7:45A	9:15	RJE	18100	3050
	LCS				↓	↓	↓	↓	
	LCSD								
	313-01	.45			↓	↓	↓	↓	
	MS	.48							
	MSD	.49							
	313-02	.49			↓	↓	↓	↓	
	-03	.49							
	322-01	.53			↓	↓	↓	↓	
	332-01	.55							
	-02	.55						↓	
	MB	50						18101	3005
	LCS	↓			↓	↓	↓	↓	
	LCSD								
	317-01C	↓			↓	↓	↓	↓	
	MS								
	MSD								
	02C								
	326-01C	↓			↓	↓	↓	↓	

Final Volume is 50 ml unless noted otherwise

000013

ICP METHOD BLANK SUMMARY

Lab Name: Belmont Labs Work Order: 08-09-332
 Sample Position: Rack 1, Tube 10 Date Analyzed: 9/12/2008
 Instrument: Varian 720 Time Analyzed: 11:01

THIS METHOD BLANK APPLIES TO THE FOLLOWING ANALYSES

Lab Sample ID	Sample Position	Time Analyzed
1 LCS-18700	Rack 1, Tube 11	9/12/2008 11:12
2 LCSD-18700	Rack 1, Tube 12	9/12/2008 11:16
3 0809332-001	Rack 1, Tube 19	9/12/2008 11:49
4 0809332-002	Rack 1, Tube 20	9/12/2008 11:55
5		
6		
7		
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17		
18		
19		

000020

091208-1@720/725/730/735-ES@Quant@ All Data Report 9/17/2008, 11:39:12 AM

Blank (Blk) 9/12/2008, 9:53:39 AM Rack 0, Tube 1

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
Ag 328.068	0.00000	ppm	7.945	23.2	-34.3
Al 308.215	0.00000	ppm	3.076	1.4	225
As 188.980	0.00000	ppm	3.418	50.5	6.77
Au 267.594	0.00000	ppm	1.435	4.4	32.8
B 249.678	0.00000	ppm	2.302	1.4	159
Ba 413.064	0.00000	ppm	7.929	7.3	109
Be 313.042	0.00000	ppm	11.746	4.7	251
Bi 223.061	0.00000	ppm	2.819	22.1	12.7
Ca 370.602	0.00000	ppm	5.518	3.5	156
Cd 214.439	0.00000	ppm	3.603	39.0	9.25
Co 228.615	0.00000	ppm	5.383	9.1	59.1
Cr 267.716	0.00000	ppm	3.789	38.7	9.80
Cu 327.395	0.00000	ppm	4.766	12.1	39.3
Fe 259.940	0.00000	ppm	14.211	6.4	221
Hg 184.887	0.00000	ppm	0.507	7.7	6.60
K 769.897	0.00000	ppm	69.168	0.8	8264
Li 670.783	0.00000	ppm	12.590	1.9	650
Mg 279.800	0.00000	ppm	1.912	6.1	31.6
Mn 257.610	0.00000	ppm	4.935	3.2	153
Mo 202.032	0.00000	ppm	3.688	9.7	38.2
Na 568.821	0.00000	ppm	26.743	20.5	130
Ni 231.604	0.00000	ppm	3.785	52.0	-7.28
P 213.618	0.00000	ppm	2.341	9.5	24.6
Pb 220.353	0.00000	ppm	2.356	19.9	11.8
Pd 340.458	0.00000	ppm	9.388	24.7	38.0
Pt 306.471	0.00000	ppm	8.462	51.2	16.5
Sb 206.834	0.00000	ppm	0.592	11.9	4.96
Se 196.026	0.00000	ppm	2.299	27.1	8.48
Si 251.611	0.00000	ppm	2.226	3.7	60.2
Sn 189.925	0.00000	ppm	0.568	7.7	7.40
Sr 216.596	0.00000	ppm	3.783	46.5	8.13
Ti 334.941	0.00000	ppm	8.721	8.5	103
Tl 190.794	0.00000	ppm	1.161	11.1	10.5
V 311.837	0.00000	ppm	9.557	23.2	41.2
Zn 213.857	0.00000	ppm	1.003	0.4	278

Standard 1 (Std) 9/12/2008, 9:56:15 AM Rack 0, Tube 2

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
Ag 328.068	2.00	ppm	138.134	0.2	70669
Al 308.215	2.00	ppm	19.139	0.2	8185
As 188.980	2.00	ppm	7.487	0.2	4648
Au 267.594	2.00	ppm	913.789	7.4	12419
B 249.678	2.00	ppm	533.657	2.6	20599
Ba 413.064	2.00	ppm	40.246	0.2	19398
Be 313.042	2.00	ppm	4103.622	0.1	3666736
Bi 223.061	2.00	ppm	50.893	0.1	59892
Ca 370.602	2.00	ppm	11.080	0.1	8264
Cd 214.439	2.00	ppm	675.815	0.6	106546
Co 228.615	2.00	ppm	62.105	0.1	44744

000021

091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 11:39:12 AM

Label	Sol'n Conc.	Units	SD(Int)	%RSD(Int)	Int. (c/s)
Cr 267.716	2.00	ppm	59.808	0.1	63527
Cu 327.395	2.00	ppm	51.332	0.1	52536
Fe 259.940	2.00	ppm	57.105	0.1	46540
Hg 184.887	2.00	ppm	30.220	0.4	7283
K 769.897	20.0	ppm	1008.239	0.3	389226
Li 670.783	2.00	ppm	22519.920	0.3	8015147
Mg 279.800	2.00	ppm	7.819	0.1	7287
Mn 257.610	2.00	ppm	1427.525	0.2	677062
Mo 202.032	2.00	ppm	367.215	1.2	30591
Na 568.821	22.0	ppm	41.777	0.5	7933
Ni 231.604	2.00	ppm	20.836	0.1	16349
P 213.618	10.0	ppm	1485.692	0.7	213594
Pb 220.353	2.00	ppm	13.684	0.1	10841
Pd 340.458	2.00	ppm	14.792	0.1	22302
Pt 306.471	2.00	ppm	15.205	0.3	5530
Sb 206.834	2.00	ppm	5.054	0.1	4312
Se 196.026	2.00	ppm	6.526	0.2	2694
Si 251.611	1.00	ppm	21.410	0.9	2302
Sn 189.925	2.00	ppm	107.775	0.2	47514
Sr 216.596	2.00	ppm	91.135	0.2	41850
Ti 334.941	2.00	ppm	811.554	0.3	296218
Tl 190.794	2.00	ppm	110.549	2.5	4405
V 311.837	2.00	ppm	107.059	0.1	92686
Zn 213.857	2.00	ppm	322.324	0.3	104384

Cont Calib Verif (CCV)

9/12/2008, 10:01:52 AM

Rack 0, Tube 3

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	QC Value
Ag 328.068	1.99	ppm	0.00469	0.2	70368	1.99 ppm	99.57376
Al 308.215	1.99	ppm	0.00607	0.3	8138	1.99 ppm	99.41101
As 188.980	1.99	ppm	0.00409	0.2	4631	1.99 ppm	99.63568
Au 267.594	2.00	ppm	0.145	7.2	12400	2.00 ppm	99.84344
B 249.678	2.03	ppm	0.0388	1.9	20894	2.03 ppm	101.43960
Ba 413.064	1.99	ppm	0.00601	0.3	19253	1.99 ppm	99.25101
Be 313.042	1.99	ppm	0.00097	0.0	3640110	1.99 ppm	99.27380
Bi 223.061	1.99	ppm	0.00331	0.2	59639	1.99 ppm	99.57766
Ca 370.602	1.99	ppm	0.00963	0.5	8239	1.99 ppm	99.69814
Cd 214.439	1.99	ppm	0.00119	0.1	105851	1.99 ppm	99.34762
Co 228.615	1.99	ppm	0.00303	0.2	44544	1.99 ppm	99.55165
Cr 267.716	1.99	ppm	0.00321	0.2	63156	1.99 ppm	99.41544
Cu 327.395	1.99	ppm	0.00344	0.2	52311	1.99 ppm	99.57299
Fe 259.940	1.99	ppm	0.00281	0.1	46229	1.99 ppm	99.32781
Hg 184.887	1.99	ppm	0.00636	0.3	7262	1.99 ppm	99.70064
K 769.897	19.8	ppm	0.0435	0.2	385851	19.8 ppm	99.11406
Li 670.783	1.98	ppm	0.00142	0.1	7953405	1.98 ppm	99.22962
Mg 279.800	1.99	ppm	0.00247	0.1	7268	1.99 ppm	99.73919
Mn 257.610	1.98	ppm	0.00432	0.2	671961	1.98 ppm	99.24648
Mo 202.032	1.99	ppm	0.0230	1.2	30463	1.99 ppm	99.58196
Na 568.821	21.8	ppm	0.0423	0.2	7876	21.8 ppm	99.26720
Ni 231.604	1.99	ppm	0.00337	0.2	16243	1.99 ppm	99.35220

000022

091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 11:39:12 AM

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	QC Value
P 213.618	9.96	ppm	0.0233	0.2	212680	9.96 ppm	99.57166
Pb 220.353	1.99	ppm	0.00297	0.1	10789	1.99 ppm	99.51491
Pd 340.458	1.99	ppm	0.00216	0.1	22171	1.99 ppm	99.41199
Pt 306.471	1.99	ppm	0.00704	0.4	5489	1.99 ppm	99.26202
Sb 206.834	2.00	ppm	0.00153	0.1	4303	2.00 ppm	99.79156
Se 196.026	2.00	ppm	0.00471	0.2	2697	2.00 ppm	100.12390
Si 251.611	1.00	ppm	0.0169	1.7	2304	1.00 ppm	100.07900
Sn 189.925	1.99	ppm	0.00208	0.1	47310	1.99 ppm	99.57127
Sr 216.596	1.99	ppm	0.00374	0.2	41588	1.99 ppm	99.37266
Ti 334.941	1.99	ppm	0.00605	0.3	294400	1.99 ppm	99.38593
Tl 190.794	1.99	ppm	0.0514	2.6	4391	1.99 ppm	99.68017
V 311.837	1.99	ppm	0.00451	0.2	92114	1.99 ppm	99.38277
Zn 213.857	1.99	ppm	0.00507	0.3	103972	1.99 ppm	99.60410

Initial Calib Verif (ICV)

9/12/2008, 10:07:19 AM

Rack 0, Tube 4

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	QC Value
Ag 328.068	1.92	ppm	0.00411	0.2	67751	1.92 ppm	95.87253
Al 308.215	0.910	ppm	0.00244	0.3	3846	0.910 ppm	90.98524
As 188.980	0.924	ppm	0.00314	0.3	2152	0.924 ppm	92.43013
Au 267.594	0.0111	ppm	0.00106	9.5	101	0.0111 ppm	-
B 249.678	0.962	ppm	0.0133	1.4	9987	0.962 ppm	96.15785
Ba 413.064	0.461	ppm	0.00092	0.2	4553	0.461 ppm	92.15858
Be 313.042	0.465	ppm	0.00045	0.1	852357	0.465 ppm	92.96157
Bi 223.061	0.0901	ppm	0.00020	0.2	2712	0.0901 ppm	90.01487Q
Ca 370.602	0.901	ppm	0.00284	0.3	3809	0.901 ppm	90.11714
Cd 214.439	0.471	ppm	0.00181	0.4	25112	0.471 ppm	94.24033
Co 228.615	0.456	ppm	0.00100	0.2	10243	0.456 ppm	91.16318
Cr 267.716	0.454	ppm	0.00172	0.4	14424	0.454 ppm	90.77673
Cu 327.395	0.902	ppm	0.00325	0.4	23720	0.902 ppm	90.21981
Fe 259.940	0.916	ppm	0.00315	0.3	21439	0.916 ppm	91.61803
Hg 184.887	0.00118	ppm	0.00023	19.3	10.9	0.00118 ppm	-
K 769.897	2.52	ppm	0.0156	0.6	56280	2.52 ppm	-
Li 670.783	0.951	ppm	0.00577	0.6	3811722	0.951 ppm	95.10448
Mg 279.800	0.928	ppm	0.00153	0.2	3398	0.928 ppm	92.81555
Mn 257.610	0.467	ppm	0.00173	0.4	158134	0.467 ppm	93.35424
Mo 202.032	0.947	ppm	0.00983	1.0	14504	0.947 ppm	94.69736
Na 568.821	112	ppm	0.522	0.5	39762	112 ppm	111.74420Q
Ni 231.604	0.914	ppm	0.00404	0.4	7470	0.914 ppm	91.42441
P 213.618	0.194	ppm	0.00220	1.1	4164	0.194 ppm	96.9133Q
Pb 220.353	0.940	ppm	0.00185	0.2	5103	0.940 ppm	94.03197
Pd 340.458	-0.00066	ppm	0.00054	81.1	30.6	-0.00066 ppm	-
Pt 306.471	-0.00261	ppm	0.00074	28.3	9.35	-0.00261 ppm	-
Sb 206.834	0.942	ppm	0.00469	0.5	2035	0.942 ppm	94.24944
Se 196.026	1.90	ppm	0.00355	0.2	2561	1.90 ppm	95.03801
Si 251.611	0.0266	ppm	0.00095	3.6	120	0.0266 ppm	-
Sn 189.925	0.0949	ppm	0.00048	0.5	2261	0.0949 ppm	94.8801Q
Sr 216.596	0.966	ppm	0.00320	0.3	20223	0.966 ppm	96.62322
Ti 334.941	0.930	ppm	0.00241	0.3	137860	0.930 ppm	93.04268
Tl 190.794	0.893	ppm	0.0380	4.2	1973	0.893 ppm	89.32950Q

000023

091208-1@720/725/730/735-ES@Quant@ All Data Report 9/17/2008, 11:39:12 AM

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	QC Value
V 311.837	0.467	ppm	0.00062	0.1	21659	0.467 ppm	93.33648
Zn 213.857	0.468	ppm	0.00082	0.2	24643	0.468 ppm	93.61709

CRI (CRI)

9/12/2008, 10:11:22 AM

Rack 0, Tube 5

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	QC Value
Ag 328.068	0.0666	ppm	0.00048	0.7	2322	0.0666 ppm	111.07790
Al 308.215	0.0672	ppm	0.00261	3.9	492	0.0672 ppm	112.01280
As 188.980	0.0624	ppm	0.00082	1.3	152	0.0624 ppm	104.05220
Au 267.594	0.00218	ppm	0.00152	69.9	46.3	0.00218 ppm	3.62818R
B 249.678	0.0671	ppm	0.00324	4.8	845	0.0671 ppm	111.83830
Ba 413.064	0.0639	ppm	0.00061	1.0	725	0.0639 ppm	106.44530
Be 313.042	0.0636	ppm	0.00025	0.4	116920	0.0636 ppm	106.06780
Bi 223.061	0.00165	ppm	0.00012	7.6	62.0	0.00165 ppm	2.74188R
Ca 370.602	0.0430	ppm	0.00078	1.8	330	0.0430 ppm	-
Cd 214.439	0.0678	ppm	0.00032	0.5	3619	0.0678 ppm	112.93730
Co 228.615	0.0658	ppm	0.00036	0.6	1529	0.0658 ppm	109.61820
Cr 267.716	0.0644	ppm	0.00013	0.2	2055	0.0644 ppm	107.31540
Cu 327.395	0.0622	ppm	0.00046	0.7	1673	0.0622 ppm	103.71020
Fe 259.940	0.0362	ppm	0.00269	7.4	1060	0.0362 ppm	60.41151R
Hg 184.887	0.0429	ppm	0.00544	12.7	163	0.0429 ppm	-
K 769.897	0.394	ppm	0.00972	2.5	15771	0.394 ppm	-
Li 670.783	0.0598	ppm	0.00071	1.2	240129	0.0598 ppm	99.60234
Mg 279.800	0.0635	ppm	0.00129	2.0	262	0.0635 ppm	-
Mn 257.610	0.0684	ppm	0.00032	0.5	23312	0.0684 ppm	114.04070
Mo 202.032	0.0390	ppm	0.00185	4.8	633	0.0390 ppm	64.94488R
Na 568.821	0.392	ppm	0.111	28.4	269	0.392 ppm	-
Ni 231.604	0.0664	ppm	0.00062	0.9	536	0.0664 ppm	110.66510
P 213.618	0.0341	ppm	0.00006	0.2	752	0.0341 ppm	11.35916R
Pb 220.353	0.0634	ppm	0.00221	3.5	355	0.0634 ppm	105.59820
Pd 340.458	-0.00037	ppm	0.00053	144.9	33.9	-0.00037 ppm	-0.60906R
Pt 306.471	-0.00485	ppm	0.00157	32.5	3.17	-0.00485 ppm	-8.07696R
Sb 206.834	0.0638	ppm	0.00172	2.7	142	0.0638 ppm	106.40120
Se 196.026	0.0697	ppm	0.00059	0.8	102	0.0697 ppm	116.08600
Si 251.611	0.0153	ppm	0.00174	11.4	94.5	0.0153 ppm	-
Sn 189.925	0.00322	ppm	0.00012	3.6	84.0	0.00322 ppm	5.37211R
Sr 216.596	0.0666	ppm	0.00020	0.3	1401	0.0666 ppm	110.99650
Ti 334.941	0.0540	ppm	0.00092	1.7	8102	0.0540 ppm	90.04600
Tl 190.794	0.0501	ppm	0.00231	4.6	121	0.0501 ppm	83.47350
V 311.837	0.0562	ppm	0.00295	5.3	2644	0.0562 ppm	93.66384
Zn 213.857	0.0649	ppm	0.00019	0.3	3655	0.0649 ppm	108.12460

Interf Check AB (ICSAB)

9/12/2008, 10:15:13 AM

Rack 0, Tube 6

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	QC Value
Ag 328.068	1.04	ppm	0.00162	0.2	36883	1.04 ppm	104.42800
Al 308.215	195	ppm	0.113	0.1	775446	195 ppm	-
As 188.980	0.995	ppm	0.00540	0.5	2315	0.995 ppm	99.45343
Au 267.594	0.0258	ppm	0.00060	2.3	193	0.0258 ppm	-

000024

091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 11:39:12 AM

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Cale Conc.	QC Value
B 249.678	1.15	ppm	0.0247	2.2	11897	1.15 ppm	114.85160
Ba 413.064	0.994	ppm	0.00103	0.1	9700	0.994 ppm	99.44593
Be 313.042	0.970	ppm	0.00210	0.2	1778950	0.970 ppm	97.02472
Bi 223.061	0.0953	ppm	0.00029	0.3	2866	0.0953 ppm	9.52968G
Ca 370.602	193	ppm	0.493	0.3	782985	193 ppm	96.55099
Cd 214.439	0.967	ppm	0.00130	0.1	51535	0.967 ppm	96.72821
Co 228.615	0.936	ppm	0.00092	0.1	20969	0.936 ppm	93.58659
Cr 267.716	0.954	ppm	0.00344	0.4	30300	0.954 ppm	95.37654
Cu 327.395	0.997	ppm	0.00148	0.1	26206	0.997 ppm	99.69072
Fe 259.940	152	ppm	0.197	0.1	3515907	152 ppm	-
Hg 184.887	0.00125	ppm	0.00093	74.7	11.1	0.00125 ppm	-
K 769.897	12.9	ppm	0.0685	0.5	254215	12.9 ppm	-
Li 670.783	1.03	ppm	0.0172	1.7	4131856	1.03 ppm	103.09340
Mg 279.800	200x	ppm	0.440	0.2	725278	200 ppm	99.96515
Mn 257.610	0.985	ppm	0.00196	0.2	333419	0.985 ppm	98.46708
Mo 202.032	0.989	ppm	0.00727	0.7	15146	0.989 ppm	98.89920
Na 568.821	18.8	ppm	0.0476	0.3	6783	18.8 ppm	-
Ni 231.604	0.922	ppm	0.00069	0.1	7537	0.922 ppm	92.24741
P 213.618	0.103	ppm	0.00062	0.6	2229	0.103 ppm	10.32268G
Pb 220.353	0.932	ppm	0.00334	0.4	5059	0.932 ppm	93.21847
Pd 340.458	-0.00145	ppm	0.00032	22.2	21.8	-0.00145 ppm	-
Pt 306.471	-0.00299	ppm	0.00060	20.0	8.29	-0.00299 ppm	-
Sb 206.834	0.994	ppm	0.00182	0.2	2147	0.994 ppm	99.44042
Se 196.026	0.996	ppm	0.00445	0.4	1346	0.996 ppm	99.62861
Si 251.611	0.575	ppm	0.00228	0.4	1349	0.575 ppm	-
Sn 189.925	0.0971	ppm	0.00010	0.1	2314	0.0971 ppm	9.71179G
Sr 216.596	0.978	ppm	0.00157	0.2	20462	0.978 ppm	97.76831
Ti 334.941	0.977	ppm	0.00127	0.1	144762	0.977 ppm	97.70491
Tl 190.794	0.890	ppm	0.0328	3.7	1966	0.890 ppm	89.00873
V 311.837	0.983	ppm	0.00153	0.2	45557	0.983 ppm	98.25875
Zn 213.857	1.01	ppm	0.00373	0.4	53098	1.01 ppm	101.47400

Initial Calib Blank (ICB)

9/12/2008, 10:18:36 AM

Rack 4, Tube 1

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Cale Conc.	QC Value
Ag 328.068	0.00023	ppm	0.00033	145.6	-26.2	0.00023 ppm	0.00023
Al 308.215	0.0132	ppm	0.00092	7.0	277	0.0132 ppm	0.01323
As 188.980	-0.00066	ppm	0.00062	94.3	5.24	-0.00066 ppm	-0.00066
Au 267.594	-0.00106	ppm	0.00044	42.0	26.3	-0.00106 ppm	-0.00106
B 249.678	0.0353	ppm	0.0109	30.9	520	0.0353 ppm	0.03533
Ba 413.064	0.00254	ppm	0.00042	16.4	133	0.00254 ppm	0.00254
Be 313.042	0.00021	ppm	0.00001	3.2	643	0.00021 ppm	0.00021
Bi 223.061	0.00026	ppm	0.00029	110.4	20.5	0.00026 ppm	0.00026
Ca 370.602	0.00133	ppm	0.00136	102.5	161	0.00133 ppm	0.00133
Cd 214.439	0.00025	ppm	0.00002	9.6	22.5	0.00025 ppm	0.00025
Co 228.615	0.00030	ppm	0.00026	88.4	65.8	0.00030 ppm	0.00030
Cr 267.716	0.00029	ppm	0.00008	26.9	19.1	0.00029 ppm	0.00029
Cu 327.395	-0.00004	ppm	0.00034	886.4	38.2	-0.00004 ppm	-0.00004
Fe 259.940	0.0467	ppm	0.0145	31.1	1303	0.0467 ppm	0.04672
Hg 184.887	-0.00005	ppm	0.00024	515.0	6.44	-0.00005 ppm	-0.00005

000025

091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 11:39:12 AM

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	QC Value
K 769.897	0.00056	ppm	0.00687	1230.4	8275	0.00056 ppm	0.00056
Li 670.783	0.00021	ppm	0.00002	11.2	1478	0.00021 ppm	0.00021
Mg 279.800	0.00324	ppm	0.00215	66.4	43.3	0.00324 ppm	0.00324
Mn 257.610	0.00023	ppm	0.00001	6.6	230	0.00023 ppm	0.00023
Mo 202.032	0.00600	ppm	0.00137	22.8	130	0.00600 ppm	0.00600
Na 568.821	-0.139	ppm	0.0649	46.7	81.0	-0.139 ppm	-0.13887
Ni 231.604	-0.00028	ppm	0.00025	91.3	-9.55	-0.00028 ppm	-0.00028
P 213.618	0.00050	ppm	0.00012	24.1	35.2	0.00050 ppm	0.00050
Pb 220.353	0.00101	ppm	0.00072	71.4	17.3	0.00101 ppm	0.00101
Pd 340.458	0.00015	ppm	0.00042	272.3	39.7	0.00015 ppm	0.00015
Pt 306.471	-0.00184	ppm	0.00048	26.0	11.5	-0.00184 ppm	-0.00184
Sb 206.834	0.00130	ppm	0.00154	117.8	7.77	0.00130 ppm	0.00130
Se 196.026	0.00218	ppm	0.00077	35.5	11.4	0.00218 ppm	0.00218
Si 251.611	-0.00042	ppm	0.00328	783.9	59.3	-0.00042 ppm	-0.00042
Sn 189.925	0.00019	ppm	0.00007	36.1	12.0	0.00019 ppm	0.00019
Sr 216.596	0.00024	ppm	0.00009	39.1	13.2	0.00024 ppm	0.00024
Ti 334.941	0.00093	ppm	0.00011	11.7	241	0.00093 ppm	0.00093
Tl 190.794	0.0126	ppm	0.00260	20.7	38.1	0.0126 ppm	0.01259
V 311.837	0.00020	ppm	0.00021	103.3	50.5	0.00020 ppm	0.00020
Zn 213.857	0.00015	ppm	0.00009	59.2	285	0.00015 ppm	0.00015

MB-18700 (Samp)

9/12/2008, 11:01:14 AM

Rack 1, Tube 10

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Ag 328.068	0.00003	ppm	0.00019	564.5	-33.1	0.00003 ppm
Al 308.215	-0.00494	ppm	0.00054	10.9	205	-0.00494 ppm
As 188.980	0.00057	ppm	0.00036	62.7	8.09	0.00057 ppm
Au 267.594	-0.00300	ppm	0.00095	31.6	14.2	-0.00300 ppm
B 249.678	0.0170	ppm	0.00494	29.0	333	0.0170 ppm
Ba 413.064	0.00353	ppm	0.00081	23.0	143	0.00353 ppm
Be 313.042	-0.00007	ppm	0.00000	5.1	126	-0.00007 ppm
Bi 223.061	-0.00024	ppm	0.00008	35.2	5.60	-0.00024 ppm
Ca 370.602	-0.00178	ppm	0.00178	99.8	149	-0.00178 ppm
Cd 214.439	0.00003	ppm	0.00008	289.5	10.7	0.00003 ppm
Co 228.615	0.00020	ppm	0.00011	52.4	63.6	0.00020 ppm
Cr 267.716	0.00017	ppm	0.00017	98.7	15.3	0.00017 ppm
Cu 327.395	-0.00011	ppm	0.00038	339.9	36.3	-0.00011 ppm
Fe 259.940	-0.00479	ppm	0.00032	6.8	110	-0.00479 ppm
Hg 184.887	-0.00089	ppm	0.00029	32.3	3.38	-0.00089 ppm
K 769.897	0.0346	ppm	0.00555	16.0	8923	0.0346 ppm
Li 670.783	0.00008	ppm	0.00000	5.6	981	0.00008 ppm
Mg 279.800	-0.00209	ppm	0.00145	69.5	24.0	-0.00209 ppm
Mn 257.610	-0.00038	ppm	0.00003	7.0	23.6	-0.00038 ppm
Mo 202.032	-0.00154	ppm	0.00011	7.1	14.6	-0.00154 ppm
Na 568.821	-0.165	ppm	0.0148	9.0	71.9	-0.165 ppm
Ni 231.604	-0.00141	ppm	0.00032	23.0	-18.8	-0.00141 ppm
P 213.618	-0.00057	ppm	0.00015	26.8	12.3	-0.00057 ppm
Pb 220.353	0.00141	ppm	0.00084	59.3	19.5	0.00141 ppm
Pd 340.458	0.00185	ppm	0.00099	53.7	58.5	0.00185 ppm
Pt 306.471	-0.00103	ppm	0.00286	277.0	13.7	-0.00103 ppm

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Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Cale Conc.
Sb 206.834	0.00070	ppm	0.00145	208.1	6.46	0.00070 ppm
Se 196.026	0.00311	ppm	0.00132	42.5	12.7	0.00311 ppm
Si 251.611	0.0151	ppm	0.00325	21.5	94.1	0.0151 ppm
Sn 189.925	-0.00000	ppm	0.00008	1914.7	7.31	-0.00000 ppm
Sr 216.596	0.00017	ppm	0.00017	97.4	11.7	0.00017 ppm
Ti 334.941	-0.00027	ppm	0.00000	0.9	62.2	-0.00027 ppm
Tl 190.794	-0.00200	ppm	0.00081	40.7	6.08	-0.00200 ppm
V 311.837	0.00007	ppm	0.00006	82.9	44.4	0.00007 ppm
Zn 213.857	-0.00339	ppm	0.00008	2.4	101	-0.00339 ppm

Cont Calib Verif (CCV)

9/12/2008, 11:03:50 AM

Rack 0, Tube 3

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Cale Conc.	QC Value
Ag 328.068	1.99	ppm	0.00645	0.3	70467	1.99 ppm	99.71371
Al 308.215	2.08	ppm	0.00272	0.1	8495	2.08 ppm	103.88840
As 188.980	2.08	ppm	0.00429	0.2	4837	2.08 ppm	104.07070
Au 267.594	1.99	ppm	0.146	7.4	12348	1.99 ppm	99.42795
B 249.678	1.98	ppm	0.0425	2.1	20412	1.98 ppm	99.08274
Ba 413.064	2.03	ppm	0.00322	0.2	19734	2.03 ppm	101.74310
Be 313.042	1.98	ppm	0.00485	0.2	3631082	1.98 ppm	99.02757
Bi 223.061	2.01	ppm	0.00211	0.1	60209	2.01 ppm	100.52930
Ca 370.602	2.06	ppm	0.00498	0.2	8495	2.06 ppm	102.85390
Cd 214.439	2.10	ppm	0.00436	0.2	112093	2.10 ppm	105.20670
Co 228.615	2.05	ppm	0.00522	0.3	45751	2.05 ppm	102.25260
Cr 267.716	2.02	ppm	0.00702	0.3	64268	2.02 ppm	101.16720
Cu 327.395	1.98	ppm	0.00163	0.1	52059	1.98 ppm	99.09116
Fe 259.940	2.02	ppm	0.00363	0.2	47041	2.02 ppm	101.08180
Hg 184.887	2.11	ppm	0.00889	0.4	7671	2.11 ppm	105.32250
K 769.897	22.2	ppm	0.112	0.5	431266	22.2 ppm	111.03520Q
Li 670.783	2.29	ppm	0.0127	0.6	9168172	2.29 ppm	114.38670Q
Mg 279.800	2.12	ppm	0.00455	0.2	7707	2.12 ppm	105.78870
Mn 257.610	2.02	ppm	0.00315	0.2	682739	2.02 ppm	100.83870
Mo 202.032	2.03	ppm	0.0201	1.0	31065	2.03 ppm	101.55280
Na 568.821	23.8	ppm	0.0947	0.4	8587	23.8 ppm	108.37910
Ni 231.604	2.06	ppm	0.00733	0.4	16838	2.06 ppm	102.98530
P 213.618	10.6	ppm	0.0370	0.4	225464	10.6 ppm	105.55780
Pb 220.353	2.10	ppm	0.00585	0.3	11384	2.10 ppm	105.01540
Pd 340.458	2.00	ppm	0.00219	0.1	22284	2.00 ppm	99.92162
Pt 306.471	1.97	ppm	0.00201	0.1	5452	1.97 ppm	98.59212
Sb 206.834	2.04	ppm	0.00602	0.3	4391	2.04 ppm	101.82810
Se 196.026	2.10	ppm	0.00538	0.3	2834	2.10 ppm	105.19960
Si 251.611	1.01	ppm	0.00931	0.9	2328	1.01 ppm	101.13910
Sn 189.925	2.11	ppm	0.00652	0.3	50023	2.11 ppm	105.28300
Sr 216.596	2.07	ppm	0.00396	0.2	43349	2.07 ppm	103.58080
Ti 334.941	1.98	ppm	0.00378	0.2	293133	1.98 ppm	98.95826
Tl 190.794	2.06	ppm	0.0537	2.6	4531	2.06 ppm	102.86450
V 311.837	1.99	ppm	0.00104	0.1	92154	1.99 ppm	99.42613
Zn 213.857	2.04	ppm	0.00606	0.3	106713	2.04 ppm	102.23740

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091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 11:39:12 AM

Cont Calib Blank (CCB)

9/12/2008, 11:09:27 AM

Rack 4, Tube 2

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	QC Value
Ag 328.068	0.00032	ppm	0.00028	87.6	-22.8	0.00032 ppm	0.00032
Al 308.215	0.0106	ppm	0.00245	23.1	267	0.0106 ppm	0.01061
As 188.980	0.00077	ppm	0.00162	209.4	8.57	0.00077 ppm	0.00077
Au 267.594	0.00594	ppm	0.00100	16.8	69.6	0.00594 ppm	0.00594
B 249.678	0.0297	ppm	0.00584	19.7	463	0.0297 ppm	0.02968
Ba 413.064	0.00375	ppm	0.00030	8.1	145	0.00375 ppm	0.00375
Be 313.042	0.00021	ppm	0.00000	2.0	627	0.00021 ppm	0.00021
Bi 223.061	0.00078	ppm	0.00087	111.2	36.0	0.00078 ppm	0.00078
Ca 370.602	0.00140	ppm	0.00134	95.1	162	0.00140 ppm	0.00140
Cd 214.439	0.00022	ppm	0.00009	39.0	20.9	0.00022 ppm	0.00022
Co 228.615	0.00054	ppm	0.00022	40.6	71.3	0.00054 ppm	0.00054
Cr 267.716	0.00052	ppm	0.00007	13.1	26.4	0.00052 ppm	0.00052
Cu 327.395	0.00016	ppm	0.00044	279.7	43.3	0.00016 ppm	0.00016
Fe 259.940	0.00269	ppm	0.00025	9.2	283	0.00269 ppm	0.00269
Hg 184.887	0.00078	ppm	0.00021	27.1	9.44	0.00078 ppm	0.00078
K 769.897	0.0427	ppm	0.00772	18.1	9078	0.0427 ppm	0.04272
Li 670.783	0.00027	ppm	0.00002	5.9	1719	0.00027 ppm	0.00027
Mg 279.800	0.00019	ppm	0.00219	1147.3	32.3	0.00019 ppm	0.00019
Mn 257.610	0.00021	ppm	0.00003	16.1	224	0.00021 ppm	0.00021
Mo 202.032	0.00608	ppm	0.00138	22.7	131	0.00608 ppm	0.00608
Na 568.821	-0.204	ppm	0.0682	33.4	57.9	-0.204 ppm	-0.20397
Ni 231.604	-0.00031	ppm	0.00005	17.1	-9.82	-0.00031 ppm	-0.00031
P 213.618	0.00056	ppm	0.00029	51.7	36.5	0.00056 ppm	0.00056
Pb 220.353	0.00189	ppm	0.00026	13.9	22.1	0.00189 ppm	0.00189
Pd 340.458	0.00088	ppm	0.00109	123.1	47.8	0.00088 ppm	0.00088
Pt 306.471	0.00002	ppm	0.00271	14024.4	16.6	0.00002 ppm	0.00002
Sb 206.834	0.00359	ppm	0.00174	48.5	12.7	0.00359 ppm	0.00359
Se 196.026	0.00167	ppm	0.00080	48.0	10.7	0.00167 ppm	0.00167
Si 251.611	0.00277	ppm	0.00145	52.3	66.5	0.00277 ppm	0.00277
Sn 189.925	0.00057	ppm	0.00003	5.7	20.9	0.00057 ppm	0.00057
Sr 216.596	0.00021	ppm	0.00022	104.5	12.4	0.00021 ppm	0.00021
Ti 334.941	0.00059	ppm	0.00012	19.9	190	0.00059 ppm	0.00059
Tl 190.794	0.00533	ppm	0.00059	11.1	22.2	0.00533 ppm	0.00533
V 311.837	0.00054	ppm	0.00026	48.5	66.3	0.00054 ppm	0.00054
Zn 213.857	0.00024	ppm	0.00002	8.1	290	0.00024 ppm	0.00024

LCS-18700 (Samp)

9/12/2008, 11:12:03 AM

Rack 1, Tube 11

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Ag 328.068	0.913	ppm	0.00375	0.4	32256	0.913 ppm
Al 308.215	0.957	ppm	0.00234	0.2	4032	0.957 ppm
As 188.980	0.963	ppm	0.00526	0.5	2241	0.963 ppm
Au 267.594	0.00932	ppm	0.00110	11.8	90.5	0.00932 ppm
B 249.678	0.916	ppm	0.0216	2.4	9523	0.916 ppm
Ba 413.064	0.910	ppm	0.00402	0.4	8883	0.910 ppm
Be 313.042	0.912	ppm	0.00645	0.7	1672826	0.912 ppm
Bi 223.061	0.0893	ppm	0.00054	0.6	2685	0.0893 ppm
Ca 370.602	43.8	ppm	0.183	0.4	177854	43.8 ppm

000028

091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 11:39:12 AM

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Cd 214.439	0.964	ppm	0.00430	0.4	51371	0.964 ppm
Co 228.615	0.908	ppm	0.00365	0.4	20344	0.908 ppm
Cr 267.716	0.902	ppm	0.00287	0.3	28668	0.902 ppm
Cu 327.395	0.883	ppm	0.00392	0.4	23221	0.883 ppm
Fe 259.940	0.951	ppm	0.00761	0.8	22238	0.951 ppm
Hg 184.887	0.00064	ppm	0.00056	86.9	8.93	0.00064 ppm
K 769.897	61.2	ppm	0.495	0.8	1174714	61.2 ppm
Li 670.783	0.990	ppm	0.00600	0.6	3967620	0.990 ppm
Mg 279.800	50.3	ppm	0.270	0.5	182589	50.3 ppm
Mn 257.610	0.929	ppm	0.00410	0.4	314614	0.929 ppm
Mo 202.032	0.946	ppm	0.0112	1.2	14487	0.946 ppm
Na 568.821	59.0	ppm	0.472	0.8	21047	59.0 ppm
Ni 231.604	0.910	ppm	0.00401	0.4	7437	0.910 ppm
P 213.618	0.101	ppm	0.00186	1.8	2181	0.101 ppm
Pb 220.353	0.952	ppm	0.00343	0.4	5166	0.952 ppm
Pd 340.458	-0.00085	ppm	0.00047	55.5	28.5	-0.00085 ppm
Pt 306.471	-0.00144	ppm	0.00104	72.0	12.6	-0.00144 ppm
Sb 206.834	0.929	ppm	0.00430	0.5	2006	0.929 ppm
Se 196.026	0.998	ppm	0.00526	0.5	1348	0.998 ppm
Si 251.611	0.719	ppm	0.00183	0.3	1672	0.719 ppm
Sn 189.925	0.0937	ppm	0.00061	0.6	2233	0.0937 ppm
Sr 216.596	0.957	ppm	0.00438	0.5	20022	0.957 ppm
Ti 334.941	0.901	ppm	0.00508	0.6	133466	0.901 ppm
Tl 190.794	0.886	ppm	0.0413	4.7	1957	0.886 ppm
V 311.837	0.909	ppm	0.00420	0.5	42138	0.909 ppm
Zn 213.857	0.933	ppm	0.00398	0.4	48858	0.933 ppm

LCSD-18700 (Samp)

9/12/2008, 11:16:46 AM

Rack 1, Tube 12

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Ag 328.068	0.917	ppm	0.00349	0.4	32392	0.917 ppm
Al 308.215	0.962	ppm	0.00767	0.8	4053	0.962 ppm
As 188.980	0.964	ppm	0.00575	0.6	2245	0.964 ppm
Au 267.594	0.00596	ppm	0.00028	4.8	69.7	0.00596 ppm
B 249.678	0.937	ppm	0.0197	2.1	9738	0.937 ppm
Ba 413.064	0.912	ppm	0.00496	0.5	8903	0.912 ppm
Be 313.042	0.913	ppm	0.00540	0.6	1674486	0.913 ppm
Bi 223.061	0.0900	ppm	0.00057	0.6	2707	0.0900 ppm
Ca 370.602	44.0	ppm	0.215	0.5	178551	44.0 ppm
Cd 214.439	0.965	ppm	0.00651	0.7	51389	0.965 ppm
Co 228.615	0.910	ppm	0.00372	0.4	20389	0.910 ppm
Cr 267.716	0.903	ppm	0.00516	0.6	28681	0.903 ppm
Cu 327.395	0.885	ppm	0.00171	0.2	23259	0.885 ppm
Fe 259.940	0.949	ppm	0.00465	0.5	22209	0.949 ppm
Hg 184.887	-0.00029	ppm	0.00063	218.1	5.55	-0.00029 ppm
K 769.897	61.4	ppm	0.574	0.9	1178286	61.4 ppm
Li 670.783	0.989	ppm	0.00691	0.7	3963939	0.989 ppm
Mg 279.800	50.6	ppm	0.322	0.6	183722	50.6 ppm
Mn 257.610	0.929	ppm	0.00411	0.4	314717	0.929 ppm
Mo 202.032	0.947	ppm	0.0109	1.2	14510	0.947 ppm

000029

091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 11:39:12 AM

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Na 568.821	58.9	ppm	0.379	0.6	21031	58.9 ppm
Ni 231.604	0.910	ppm	0.00484	0.5	7439	0.910 ppm
P 213.618	0.102	ppm	0.00092	0.9	2197	0.102 ppm
Pb 220.353	0.953	ppm	0.00517	0.5	5174	0.953 ppm
Pd 340.458	-0.00119	ppm	0.00034	28.3	24.7	-0.00119 ppm
Pt 306.471	-0.00128	ppm	0.00017	13.7	13.0	-0.00128 ppm
Sb 206.834	0.926	ppm	0.00127	0.1	1999	0.926 ppm
Se 196.026	1.00	ppm	0.00321	0.3	1353	1.00 ppm
Si 251.611	0.724	ppm	0.00401	0.6	1683	0.724 ppm
Sn 189.925	0.0942	ppm	0.00075	0.8	2244	0.0942 ppm
Sr 216.596	0.957	ppm	0.00518	0.5	20035	0.957 ppm
Ti 334.941	0.902	ppm	0.00297	0.3	133675	0.902 ppm
Tl 190.794	0.893	ppm	0.0375	4.2	1973	0.893 ppm
V 311.837	0.910	ppm	0.00359	0.4	42174	0.910 ppm
Zn 213.857	0.934	ppm	0.00496	0.5	48890	0.934 ppm

0809313-001A (Samp)

9/12/2008, 11:21:18 AM

Rack 1, Tube 13

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Ag 328.068	-0.00312	ppm	0.00020	6.5	-145	-0.00312 ppm
Al 308.215	64.1	ppm	0.285	0.4	255230	64.1 ppm
As 188.980	0.210	ppm	0.00271	1.3	495	0.210 ppm
Au 267.594	0.0207	ppm	0.00057	2.7	161	0.0207 ppm
B 249.678	0.0851	ppm	0.00648	7.6	1029	0.0851 ppm
Ba 413.064	1.71	ppm	0.00647	0.4	16632	1.71 ppm
Be 313.042	0.00469	ppm	0.00003	0.5	8850	0.00469 ppm
Bi 223.061	0.00220	ppm	0.00019	8.8	78.7	0.00220 ppm
Ca 370.602	80.6	ppm	0.329	0.4	327088	80.6 ppm
Cd 214.439	0.00946	ppm	0.00007	0.8	513	0.00946 ppm
Co 228.615	0.0369	ppm	0.00035	0.9	885	0.0369 ppm
Cr 267.716	0.0831	ppm	0.00030	0.4	2650	0.0831 ppm
Cu 327.395	0.171	ppm	0.00059	0.3	4520	0.171 ppm
Fe 259.940	161	ppm	0.752	0.5	3734858	161 ppm
Hg 184.887	-0.00027	ppm	0.00007	26.8	5.62	-0.00027 ppm
K 769.897	8.92	ppm	0.00494	0.1	178123	8.92 ppm
Li 670.783	0.0551	ppm	0.00023	0.4	221577	0.0551 ppm
Mg 279.800	14.3	ppm	0.0590	0.4	51731	14.3 ppm
Mn 257.610	2.57	ppm	0.0107	0.4	870899	2.57 ppm
Mo 202.032	0.0582	ppm	0.00027	0.5	927	0.0582 ppm
Na 568.821	6.97	ppm	0.114	1.6	2604	6.97 ppm
Ni 231.604	0.100	ppm	0.00125	1.2	813	0.100 ppm
P 213.618	1.08	ppm	0.00604	0.6	23034	1.08 ppm
Pb 220.353	0.250	ppm	0.00167	0.7	1366	0.250 ppm
Pd 340.458	-0.00088	ppm	0.00021	23.4	28.2	-0.00088 ppm
Pt 306.471	-0.00413	ppm	0.00142	34.3	5.16	-0.00413 ppm
Sb 206.834	0.0108	ppm	0.00021	2.0	28.2	0.0108 ppm
Se 196.026	0.0139	ppm	0.00388	28.0	27.1	0.0139 ppm
Si 251.611	23.1x	ppm	0.0323	0.1	51764	23.1 ppm
Sn 189.925	0.00056	ppm	0.00013	23.6	20.6	0.00056 ppm
Sr 216.596	0.468	ppm	0.00223	0.5	9804	0.468 ppm

000030

091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008. 11:39:12 AM

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Ti 334.941	1.03	ppm	0.00838	0.8	152240	1.03 ppm
Tl 190.794	0.00264	ppm	0.00125	47.3	16.3	0.00264 ppm
V 311.837	0.163	ppm	0.00077	0.5	7587	0.163 ppm
Zn 213.857	0.422	ppm	0.00135	0.3	22260	0.422 ppm

0809313-001A MS (Samp)

9/12/2008, 11:25:39 AM

Rack 1, Tube 14

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Ag 328.068	0.881	ppm	0.00387	0.4	31124	0.881 ppm
Al 308.215	75.4	ppm	0.289	0.4	300529	75.4 ppm
As 188.980	1.15	ppm	0.00947	0.8	2679	1.15 ppm
Au 267.594	0.0225	ppm	0.00074	3.3	172	0.0225 ppm
B 249.678	0.900	ppm	0.0171	1.9	9359	0.900 ppm
Ba 413.064	2.62	ppm	0.0124	0.5	25369	2.62 ppm
Be 313.042	0.880	ppm	0.00530	0.6	1613699	0.880 ppm
Bi 223.061	0.0880	ppm	0.00064	0.7	2648	0.0880 ppm
Ca 370.602	125	ppm	0.518	0.4	505604	125 ppm
Cd 214.439	0.920	ppm	0.00588	0.6	49004	0.920 ppm
Co 228.615	0.910	ppm	0.00334	0.4	20398	0.910 ppm
Cr 267.716	0.955	ppm	0.00315	0.3	30326	0.955 ppm
Cu 327.395	1.04	ppm	0.00482	0.5	27364	1.04 ppm
Fe 259.940	171	ppm	0.710	0.4	3966694	171 ppm
Hg 184.887	0.00088	ppm	0.00046	52.0	9.82	0.00088 ppm
K 769.897	71.0	ppm	0.593	0.8	1360169	71.0 ppm
Li 670.783	0.975	ppm	0.0120	1.2	3907419	0.975 ppm
Mg 279.800	63.1	ppm	0.142	0.2	228807	63.1 ppm
Mn 257.610	3.57	ppm	0.0144	0.4	1208916	3.57 ppm
Mo 202.032	0.948	ppm	0.00832	0.9	14524	0.948 ppm
Na 568.821	64.8	ppm	0.578	0.9	23102	64.8 ppm
Ni 231.604	0.970	ppm	0.00310	0.3	7926	0.970 ppm
P 213.618	1.23	ppm	0.00296	0.2	26332	1.23 ppm
Pb 220.353	1.13	ppm	0.00432	0.4	6135	1.13 ppm
Pd 340.458	-0.00047	ppm	0.00059	126.7	32.8	-0.00047 ppm
Pt 306.471	-0.00173	ppm	0.00077	44.4	11.8	-0.00173 ppm
Sb 206.834	0.839	ppm	0.00425	0.5	1812	0.839 ppm
Se 196.026	0.959	ppm	0.00177	0.2	1296	0.959 ppm
Si 251.611	23.1x	ppm	0.0517	0.2	51805	23.1 ppm
Sn 189.925	0.0891	ppm	0.00043	0.5	2123	0.0891 ppm
Sr 216.596	1.39	ppm	0.00627	0.5	29021	1.39 ppm
Ti 334.941	1.78	ppm	0.0222	1.2	263682	1.78 ppm
Tl 190.794	0.805	ppm	0.0276	3.4	1779	0.805 ppm
V 311.837	1.06	ppm	0.00477	0.4	49156	1.06 ppm
Zn 213.857	1.34	ppm	0.00617	0.5	69862	1.34 ppm

0809313-001A MSD (Samp)

9/12/2008, 11:30:26 AM

Rack 1, Tube 15

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Ag 328.068	0.877	ppm	0.00374	0.4	30966	0.877 ppm
Al 308.215	74.2	ppm	0.611	0.8	295748	74.2 ppm

000031

091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 11:39:12 AM

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
As 188.980	1.14	ppm	0.00798	0.7	2657	1.14 ppm
Au 267.594	0.0218	ppm	0.00060	2.8	168	0.0218 ppm
B 249.678	0.910	ppm	0.0127	1.4	9459	0.910 ppm
Ba 413.064	2.62	ppm	0.0150	0.6	25424	2.62 ppm
Be 313.042	0.878	ppm	0.00529	0.6	1610156	0.878 ppm
Bi 223.061	0.0881	ppm	0.00049	0.6	2650	0.0881 ppm
Ca 370.602	126	ppm	0.812	0.6	510097	126 ppm
Cd 214.439	0.918	ppm	0.00614	0.7	48897	0.918 ppm
Co 228.615	0.907	ppm	0.00446	0.5	20324	0.907 ppm
Cr 267.716	0.954	ppm	0.00459	0.5	30321	0.954 ppm
Cu 327.395	1.04	ppm	0.00374	0.4	27447	1.04 ppm
Fe 259.940	172	ppm	1.59	0.9	3993416	172 ppm
Hg 184.887	0.00117	ppm	0.00032	27.5	10.8	0.00117 ppm
K 769.897	70.7	ppm	0.730	1.0	1354867	70.7 ppm
Li 670.783	0.985	ppm	0.0290	2.9	3947802	0.985 ppm
Mg 279.800	63.1	ppm	0.449	0.7	229067	63.1 ppm
Mn 257.610	3.46	ppm	0.0198	0.6	1172632	3.46 ppm
Mo 202.032	0.949	ppm	0.0111	1.2	14532	0.949 ppm
Na 568.821	64.7	ppm	0.601	0.9	23066	64.7 ppm
Ni 231.604	0.965	ppm	0.00495	0.5	7885	0.965 ppm
P 213.618	1.23	ppm	0.00621	0.5	26334	1.23 ppm
Pb 220.353	1.12	ppm	0.00628	0.6	6090	1.12 ppm
Pd 340.458	-0.00078	ppm	0.00041	52.7	29.2	-0.00078 ppm
Pt 306.471	-0.00192	ppm	0.00181	94.3	11.3	-0.00192 ppm
Sb 206.834	0.836	ppm	0.00256	0.3	1804	0.836 ppm
Se 196.026	0.960	ppm	0.0110	1.2	1298	0.960 ppm
Si 251.611	23.0x	ppm	0.112	0.5	51584	23.0 ppm
Sn 189.925	0.0887	ppm	0.00083	0.9	2114	0.0887 ppm
Sr 216.596	1.39	ppm	0.00899	0.6	29063	1.39 ppm
Ti 334.941	1.75	ppm	0.0213	1.2	258977	1.75 ppm
Tl 190.794	0.806	ppm	0.0308	3.8	1782	0.806 ppm
V 311.837	1.06	ppm	0.00495	0.5	49008	1.06 ppm
Zn 213.857	1.34	ppm	0.00703	0.5	70010	1.34 ppm

0809332-001A (Samp)

9/12/2008, 11:49:56 AM

Rack 1, Tube 19

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Ag 328.068	0.00041	ppm	0.00037	90.6	-19.8	0.00041 ppm
Al 308.215	11.5	ppm	0.0617	0.5	46086	11.5 ppm
As 188.980	0.00797	ppm	0.00258	32.4	25.3	0.00797 ppm
Au 267.594	0.00665	ppm	0.00125	18.8	74.0	0.00665 ppm
B 249.678	0.132	ppm	0.00042	0.3	1511	0.132 ppm
Ba 413.064	0.963	ppm	0.00562	0.6	9396	0.963 ppm
Be 313.042	0.00055	ppm	0.00001	1.1	1261	0.00055 ppm
Bi 223.061	-0.00025	ppm	0.00011	42.9	5.26	-0.00025 ppm
Ca 370.602	1944x	ppm	8.73	0.4	7882792	1944 ppm
Cd 214.439	0.00141	ppm	0.00002	1.1	84.4	0.00141 ppm
Co 228.615	0.00376	ppm	0.00040	10.6	143	0.00376 ppm
Cr 267.716	0.0224	ppm	0.00033	1.5	721	0.0224 ppm
Cu 327.395	0.0371	ppm	0.00058	1.6	1012	0.0371 ppm

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091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 11:39:12 AM

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Fe 259.940	11.2	ppm	0.0546	0.5	258957	11.2 ppm
Hg 184.887	0.00067	ppm	0.00082	121.5	9.06	0.00067 ppm
K 769.897	5.89	ppm	0.0473	0.8	120462	5.89 ppm
Li 670.783	0.00848	ppm	0.00004	0.5	34638	0.00848 ppm
Mg 279.800	27.1	ppm	0.157	0.6	98348	27.1 ppm
Mn 257.610	0.525	ppm	0.00264	0.5	177912	0.525 ppm
Mo 202.032	0.00060	ppm	0.00027	45.0	47.3	0.00060 ppm
Na 568.821	191	ppm	2.07	1.1	67906	191 ppm
Ni 231.604	0.0121	ppm	0.00030	2.5	91.6	0.0121 ppm
P 213.618	0.463	ppm	0.00362	0.8	9909	0.463 ppm
Pb 220.353	0.0258	ppm	0.00081	3.2	151	0.0258 ppm
Pd 340.458	-0.00148	ppm	0.00016	10.9	21.5	-0.00148 ppm
Pt 306.471	0.00980	ppm	0.00219	22.3	43.5	0.00980 ppm
Sb 206.834	0.00359	ppm	0.00184	51.1	12.7	0.00359 ppm
Se 196.026	0.00857	ppm	0.00264	30.8	20.0	0.00857 ppm
Si 251.611	8.67	ppm	0.0842	1.0	19494	8.67 ppm
Sn 189.925	0.00020	ppm	0.00005	26.0	12.0	0.00020 ppm
Sr 216.596	0.439	ppm	0.00221	0.5	9184	0.439 ppm
Ti 334.941	0.172	ppm	0.00130	0.8	25637	0.172 ppm
Tl 190.794	-0.00013	ppm	0.00110	838.3	10.2	-0.00013 ppm
V 311.837	0.0132	ppm	0.00010	0.8	653	0.0132 ppm
Zn 213.857	0.0715	ppm	0.00073	1.0	3998	0.0715 ppm

0809332-002A (Samp)

9/12/2008, 11:55:19 AM

Rack 1, Tube 20

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Ag 328.068	-0.00040	ppm	0.00014	35.3	-48.3	-0.00040 ppm
Al 308.215	44.4	ppm	0.181	0.4	176946	44.4 ppm
As 188.980	0.0220	ppm	0.00116	5.3	57.8	0.0220 ppm
Au 267.594	0.00946	ppm	0.00076	8.0	91.4	0.00946 ppm
B 249.678	0.121	ppm	0.00161	1.3	1395	0.121 ppm
Ba 413.064	0.906	ppm	0.00375	0.4	8847	0.906 ppm
Be 313.042	0.00226	ppm	0.00002	0.7	4386	0.00226 ppm
Bi 223.061	0.00040	ppm	0.00006	14.7	24.8	0.00040 ppm
Ca 370.602	1418x	ppm	4.97	0.4	5748715	1418 ppm
Cd 214.439	0.00304	ppm	0.00003	1.0	171	0.00304 ppm
Co 228.615	0.0160	ppm	0.00026	1.6	416	0.0160 ppm
Cr 267.716	0.0589	ppm	0.00003	0.1	1881	0.0589 ppm
Cu 327.395	0.0575	ppm	0.00035	0.6	1549	0.0575 ppm
Fe 259.940	50.4	ppm	0.176	0.3	1168301	50.4 ppm
Hg 184.887	0.00099	ppm	0.00055	56.2	10.2	0.00099 ppm
K 769.897	14.2	ppm	0.0682	0.5	279367	14.2 ppm
Li 670.783	0.0296	ppm	0.00009	0.3	119183	0.0296 ppm
Mg 279.800	53.9	ppm	0.223	0.4	195427	53.9 ppm
Mn 257.610	0.921	ppm	0.00392	0.4	311927	0.921 ppm
Mo 202.032	0.00097	ppm	0.00024	24.9	53.0	0.00097 ppm
Na 568.821	145	ppm	1.53	1.1	51386	145 ppm
Ni 231.604	0.0396	ppm	0.00059	1.5	317	0.0396 ppm
P 213.618	0.551	ppm	0.00361	0.7	11797	0.551 ppm
Pb 220.353	0.134	ppm	0.00063	0.5	738	0.134 ppm

000033

091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 11:39:12 AM

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.
Pd 340.458	-0.00121	ppm	0.00055	45.3	24.5	-0.00121 ppm
Pt 306.471	0.00254	ppm	0.00229	89.8	23.5	0.00254 ppm
Sb 206.834	0.00580	ppm	0.00114	19.7	17.4	0.00580 ppm
Se 196.026	0.00863	ppm	0.00164	19.0	20.1	0.00863 ppm
Si 251.611	11.9	ppm	0.0474	0.4	26682	11.9 ppm
Sn 189.925	0.00024	ppm	0.00010	40.4	13.1	0.00024 ppm
Sr 216.596	0.345	ppm	0.00147	0.4	7217	0.345 ppm
Ti 334.941	0.603	ppm	0.00259	0.4	89427	0.603 ppm
Tl 190.794	-0.00004	ppm	0.00020	463.8	10.4	-0.00004 ppm
V 311.837	0.0698	ppm	0.00033	0.5	3276	0.0698 ppm
Zn 213.857	0.240	ppm	0.00081	0.3	12744	0.240 ppm

Cont Calib Verif (CCV)

9/12/2008, 12:00:26 PM

Rack 0. Tube 3

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	QC Value
Ag 328.068	2.01	ppm	0.00307	0.2	71183	2.01 ppm	100.72730
Al 308.215	2.08	ppm	0.00690	0.3	8522	2.08 ppm	104.23540
As 188.980	2.11	ppm	0.00378	0.2	4903	2.11 ppm	105.50550
Au 267.594	2.03	ppm	0.144	7.1	12628	2.03 ppm	101.68820
B 249.678	2.01	ppm	0.0435	2.2	20693	2.01 ppm	100.45860
Ba 413.064	2.04	ppm	0.00750	0.4	19816	2.04 ppm	102.16670
Be 313.042	2.00	ppm	0.00465	0.2	3666560	2.00 ppm	99.99519
Bi 223.061	2.03	ppm	0.00321	0.2	60901	2.03 ppm	101.68620
Ca 370.602	2.07	ppm	0.00320	0.2	8562	2.07 ppm	103.67810
Cd 214.439	2.12	ppm	0.00686	0.3	113147	2.12 ppm	106.19640
Co 228.615	2.06	ppm	0.00369	0.2	46188	2.06 ppm	103.23130
Cr 267.716	2.04	ppm	0.00778	0.4	64704	2.04 ppm	101.85250
Cu 327.395	2.01	ppm	0.00512	0.3	52710	2.01 ppm	100.33270
Fe 259.940	2.05	ppm	0.00413	0.2	47784	2.05 ppm	102.68470
Hg 184.887	2.13	ppm	0.0123	0.6	7763	2.13 ppm	106.58700
K 769.897	22.0	ppm	0.198	0.9	426867	22.0 ppm	109.88060
Li 670.783	2.27	ppm	0.0180	0.8	9089955	2.27 ppm	113.41080Q
Mg 279.800	2.13	ppm	0.00582	0.3	7761	2.13 ppm	106.53730
Mn 257.610	2.03	ppm	0.00313	0.2	687442	2.03 ppm	101.53350
Mo 202.032	2.04	ppm	0.0256	1.3	31237	2.04 ppm	102.11510
Na 568.821	23.5	ppm	0.261	1.1	8477	23.5 ppm	106.97420
Ni 231.604	2.07	ppm	0.00343	0.2	16921	2.07 ppm	103.49690
P 213.618	10.7	ppm	0.0670	0.6	228208	10.7 ppm	106.84240
Pb 220.353	2.11	ppm	0.00684	0.3	11435	2.11 ppm	105.48740
Pd 340.458	2.02	ppm	0.00285	0.1	22501	2.02 ppm	100.89350
Pt 306.471	1.99	ppm	0.00451	0.2	5496	1.99 ppm	99.38252
Sb 206.834	2.06	ppm	0.00325	0.2	4444	2.06 ppm	103.05710
Se 196.026	2.14	ppm	0.00156	0.1	2877	2.14 ppm	106.81030
Si 251.611	1.08	ppm	0.00881	0.8	2483	1.08 ppm	108.08430
Sn 189.925	2.11	ppm	0.0147	0.7	50113	2.11 ppm	105.47110
Sr 216.596	2.08	ppm	0.00592	0.3	43571	2.08 ppm	104.11120
Ti 334.941	2.00	ppm	0.00791	0.4	296780	2.00 ppm	100.18990
Tl 190.794	2.08	ppm	0.0511	2.5	4573	2.08 ppm	103.82950
V 311.837	2.01	ppm	0.00357	0.2	93092	2.01 ppm	100.43830
Zn 213.857	2.07	ppm	0.00810	0.4	107984	2.07 ppm	103.45760

000034

091208-1@720/725/730/735-ES@Quant@. All Data Report 9/17/2008, 11:39:12 AM

Cont Calib Blank (CCB)

9/12/2008, 12:06:03 PM

Rack 4, Tube 2

Weight: 1

Volume: 1

Dilution: 1

Label	Sol'n Conc.	Units	SD	%RSD	Int. (c/s)	Calc Conc.	QC Value
Ag 328.068	0.00011	ppm	0.00003	23.1	-30.3	0.00011 ppm	0.00011
Al 308.215	0.0132	ppm	0.00039	2.9	277	0.0132 ppm	0.01320
As 188.980	0.00010	ppm	0.00074	760.4	7.00	0.00010 ppm	0.00010
Au 267.594	0.00608	ppm	0.00117	19.2	70.4	0.00608 ppm	0.00608
B 249.678	0.0261	ppm	0.00591	22.7	426	0.0261 ppm	0.02607
Ba 413.064	0.00353	ppm	0.00052	14.7	143	0.00353 ppm	0.00353
Be 313.042	0.00021	ppm	0.00000	2.1	644	0.00021 ppm	0.00021
Bi 223.061	0.00109	ppm	0.00087	80.1	45.5	0.00109 ppm	0.00109
Ca 370.602	0.00389	ppm	0.00158	40.7	172	0.00389 ppm	0.00389
Cd 214.439	0.00034	ppm	0.00009	26.6	27.2	0.00034 ppm	0.00034
Co 228.615	0.00047	ppm	0.00014	30.6	69.7	0.00047 ppm	0.00047
Cr 267.716	0.00051	ppm	0.00021	40.6	25.8	0.00051 ppm	0.00051
Cu 327.395	0.00030	ppm	0.00020	65.1	47.2	0.00030 ppm	0.00030
Fe 259.940	0.00558	ppm	0.00038	6.8	350	0.00558 ppm	0.00558
Hg 184.887	0.00094	ppm	0.00022	23.8	10.0	0.00094 ppm	0.00094
K 769.897	0.0296	ppm	0.0106	35.9	8828	0.0296 ppm	0.02959
Li 670.783	0.00026	ppm	0.00001	5.5	1695	0.00026 ppm	0.00026
Mg 279.800	-0.00015	ppm	0.00109	710.1	31.0	-0.00015 ppm	-0.00015
Mn 257.610	0.00023	ppm	0.00001	5.2	230	0.00023 ppm	0.00023
Mo 202.032	0.00662	ppm	0.00115	17.4	139	0.00662 ppm	0.00662
Na 568.821	-0.234	ppm	0.0653	27.9	47.1	-0.234 ppm	-0.23449
Ni 231.604	0.00010	ppm	0.00034	341.5	-6.48	0.00010 ppm	0.00010
P 213.618	0.00087	ppm	0.00007	8.4	43.1	0.00087 ppm	0.00087
Pb 220.353	0.00139	ppm	0.00055	39.2	19.4	0.00139 ppm	0.00139
Pd 340.458	0.00048	ppm	0.00190	393.4	43.3	0.00048 ppm	0.00048
Pt 306.471	0.00368	ppm	0.00381	103.4	26.7	0.00368 ppm	0.00368
Sb 206.834	0.00125	ppm	0.00015	12.3	7.64	0.00125 ppm	0.00125
Se 196.026	0.00041	ppm	0.00198	483.1	9.03	0.00041 ppm	0.00041
Si 251.611	0.00415	ppm	0.00075	18.0	69.5	0.00415 ppm	0.00415
Sn 189.925	0.00066	ppm	0.00011	16.7	23.2	0.00066 ppm	0.00066
Sr 216.596	0.00037	ppm	0.00023	62.2	15.8	0.00037 ppm	0.00037
Ti 334.941	0.00070	ppm	0.00016	22.3	207	0.00070 ppm	0.00070
Tl 190.794	0.00501	ppm	0.00098	19.5	21.5	0.00501 ppm	0.00501
V 311.837	0.00051	ppm	0.00019	38.1	64.7	0.00051 ppm	0.00051
Zn 213.857	0.00024	ppm	0.00006	23.0	290	0.00024 ppm	0.00024

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APPENDIX D

AIR QUALITY CALCULATIONS

G900,TH3 AN-M14 Incendiary Grenade

Carbon Dioxide, Criteria Pollutants, Methane and Total Suspended Particulate

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
124-38-9	CO ₂	2.10E-02	1.40E-02	5.60E-01	87.36
630-08-0	Carbon Monoxide (CO)	8.00E-04	5.10E-04	2.04E-02	3.18
7439-92-1	Lead (Pb)	1.10E-02	7.00E-03	2.80E-01	43.68
74-82-8	Methane	1.20E-05	7.90E-06	3.16E-04	0.05
-	Oxides of Nitrogen (NO _x)	6.70E-04	4.30E-04	1.72E-02	2.68
-	PM 2.5	4.90E-02	3.10E-02	1.24E+00	193.44
-	PM 10	7.00E-02	4.50E-02	1.80E+00	280.80
7446-09-5	SO ₂	2.60E-02	1.70E-02	6.80E-01	106.08
12789-66-1	TSP	6.80E-02	4.40E-02	1.76E+00	274.56

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
83-32-9	Acenaphthene	4.20E-09	2.70E-09	1.08E-07	0.00
208-96-8	Acenaphthylene	3.20E-08	2.10E-08	8.40E-07	0.00
75-07-0	Acetaldehyde	2.10E-06	1.40E-06	5.60E-05	0.01
75-05-8	Acetonitrile	1.60E-07	1.00E-07	4.00E-06	0.00
98-86-2	Acetophenone	2.50E-06	1.60E-06	6.40E-05	0.01
107-02-8	Acrolein	8.30E-07	5.40E-07	2.16E-05	0.00
7429-90-5	Aluminum	4.80E-03	3.10E-03	1.24E-01	19.34
120-12-7	Anthracene	2.40E-09	1.60E-09	6.40E-08	0.00
7440-39-3	Barium	2.80E-03	1.80E-03	7.20E-02	11.23
71-43-2	Benzene	2.00E-06	1.30E-06	5.20E-05	0.01
56-55-3	Benzo[a]anthracene	2.40E-09	1.60E-09	6.40E-08	0.00
205-99-2	Benzo[b]fluoranthene	6.20E-09	4.00E-09	1.60E-07	0.00
207-08-9	Benzo[k]fluoranthene	3.90E-09	2.50E-09	1.00E-07	0.00
191-24-2	Benzo[g,h,i]perylene	3.60E-09	2.30E-09	9.20E-08	0.00
50-32-8	Benzo[a]pyrene	2.70E-09	1.80E-09	7.20E-08	0.00
75-15-0	Carbon disulfide	1.60E-07	1.00E-07	4.00E-06	0.00
75-00-3	Chloroethane	2.60E-07	1.70E-07	6.80E-06	0.00
74-87-3	Chloromethane	7.50E-08	4.80E-08	1.92E-06	0.00
7440-47-3	Chromium	5.40E-06	3.50E-06	1.40E-04	0.02
218-01-9	Chrysene	4.60E-09	3.00E-09	1.20E-07	0.00
7440-50-8	Copper	5.20E-05	3.40E-05	1.36E-03	0.21
75-71-8	Dichlorodifluoromethane	4.60E-08	2.90E-08	1.16E-06	0.00
117-81-7	bis(2-Ethylhexyl)phthalate	3.60E-05	2.30E-05	9.20E-04	0.14
206-44-0	Fluoranthene	7.80E-09	5.00E-09	2.00E-07	0.00
86-73-7	Fluorene	1.00E-08	6.60E-09	2.64E-07	0.00
74-90-8	Hydrogen cyanide	4.90E-06	3.20E-06	1.28E-04	0.02
193-39-5	Indeno[1,2,3-cd]pyrene	3.90E-09	2.50E-09	1.00E-07	0.00
7439-92-1	Lead	1.10E-02	7.00E-03	2.80E-01	43.68
7439-96-5	Manganese	1.20E-04	7.80E-05	3.12E-03	0.49
75-09-2	Methylene chloride	3.10E-07	2.00E-07	8.00E-06	0.00
91-20-3	Naphthalene	3.90E-07	2.50E-07	1.00E-05	0.00
85-01-8	Phenanthrene	1.50E-08	9.60E-09	3.84E-07	0.00
108-95-2	Phenol	2.50E-06	1.60E-06	6.40E-05	0.01
123-38-6	Propionaldehyde	1.10E-06	6.90E-07	2.76E-05	0.00
129-00-0	Pyrene	7.00E-09	4.50E-09	1.80E-07	0.00
100-42-5	Styrene	1.90E-07	1.30E-07	5.20E-06	0.00
108-88-3	Toluene	2.10E-07	1.30E-07	5.20E-06	0.00
7440-66-6	Zinc	2.40E-05	1.60E-05	6.40E-04	0.10

M030, 1/4 Pound Demolition Block Charge

Carbon Dioxide, Criteria Pollutants, Methane and Total Suspended Particulate

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
124-38-9	CO ₂	3.40E-01	1.4	56	8736
630-08-0	Carbon Monoxide (CO)	5.00E-03	2.00E-02	0.8	124.8
7439-92-1	Lead (Pb)	1.40E-04	5.60E-04	0.0224	3.4944
74-82-8	Methane	2.00E-05	8.10E-05	0.00324	0.50544
-	Oxides of Nitrogen (NO _x)	3.00E-03	1.20E-02	0.48	74.88
-	PM-2.5	4.60E-03	1.90E-02	0.76	118.56
-	PM-10	1.20E-02	5.00E-02	2	312
9/5/7446	Sulfur Dioxide (SO ₂)	8.10E-05	3.20E-04	0.0128	1.9968
12789-66-1	TSP	1.70E-02	6.70E-02	2.68	418.08

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
83-32-9	Acenaphthene	4.90E-09	2.00E-08	8.00E-07	1.25E-04
208-96-8	Acenaphthylene	3.80E-08	1.50E-07	6.00E-06	9.36E-04
107-13-1	Acrylonitrile	5.80E-07	2.30E-06	9.20E-05	1.44E-02
7429-90-5	Aluminum	2.70E-04	1.10E-03	4.40E-02	6.86E+00
120-12-7	Anthracene	7.00E-09	2.80E-08	1.12E-06	1.75E-04
7440-36-0	Antimony	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440-38-2	Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440-39-3	Barium	1.50E-04	5.90E-04	2.36E-02	3.68E+00
71-43-2	Benzene	2.90E-07	1.20E-06	4.80E-05	7.49E-03
56-55-3	Benzo[a]anthracene	2.70E-09	1.10E-08	4.40E-07	6.86E-05
7440-41-7	Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106-99-0	1,3 Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
71-36-3	n-Butanol	6.30E-06	2.50E-05	1.00E-03	1.56E-01
111-76-2	2-Butoxyethanol	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75-65-0	t-Butyl alcohol	3.90E-07	1.60E-06	6.40E-05	9.98E-03
85-68-7	Butylbenzylphthalate	5.50E-06	2.20E-05	8.80E-04	1.37E-01
7440-43-9	Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
56-23-5	Carbon tetrachloride	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74-87-3	Chloromethane	6.60E-08	2.60E-07	1.04E-05	1.62E-03
7440-47-3	Chromium	5.40E-06	2.20E-05	8.80E-04	1.37E-01
18540-29-9	Chromium hexavalent ion			0.00E+00	0.00E+00
218-01-9	Chrysene	2.60E-09	1.00E-08	4.00E-07	6.24E-05
7440-48-4	Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440-50-8	Copper	1.20E-04	4.70E-04	1.88E-02	2.93E+00
98-82-8	Cumene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
110-82-7	Cyclohexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
84-74-2	Dibutyl phthalate	2.20E-06	8.90E-06	3.56E-04	5.55E-02
75-71-8	Dichlorodifluoromethane	3.70E-09	1.50E-08	6.00E-07	9.36E-05
131-11-3	Dimethyl phthalate	0.00E+00	0.00E+00	0.00E+00	0.00E+00
99-65-0	1,3-Dinitrobenzene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
121-14-2	2,4-Dinitrotoluene	3.60E-07	1.40E-06	5.60E-05	8.74E-03
606-20-2	2,6-Dinitrotoluene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
--	Total dioxin/furan compounds	8.90E-11	3.60E-10	1.44E-08	2.25E-06
100-41-4	Ethylbenzene	7.60E-07	3.10E-06	1.24E-04	1.93E-02
74-85-1	Ethylene	6.50E-06	2.60E-05	1.04E-03	1.62E-01
117-81-7	bis(2-Ethylhexyl)phthalate	3.70E-06	1.50E-05	6.00E-04	9.36E-02
206-44-0	Fluoranthene	1.20E-08	4.90E-08	1.96E-06	3.06E-04
50-00-0	Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00
76-13-1	Freon	0.00E+00	0.00E+00	0.00E+00	0.00E+00
86-73-7	Fluorene	1.50E-08	6.00E-08	2.40E-06	3.74E-04
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	6.40E-12	2.50E-11	1.00E-09	1.56E-07
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	9.70E-13	3.90E-12	1.56E-10	2.43E-08
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.30E-13	5.10E-13	2.04E-11	3.18E-09
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	3.30E-13	1.30E-12	5.20E-11	8.11E-09

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.40E-13	9.70E-13	3.88E-11	6.05E-09
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.90E-13	7.80E-13	3.12E-11	4.87E-09
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.30E-13	5.10E-13	2.04E-11	3.18E-09
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	6.70E-14	2.70E-13	1.08E-11	1.68E-09
110-54-3	Hexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74-90-8	Hydrogen cyanide	1.30E-04	5.20E-04	2.08E-02	3.24E+00
7439-92-1	Lead	1.40E-04	5.60E-04	2.24E-02	3.49E+00
7439-96-5	Manganese	1.90E-05	7.80E-05	3.12E-03	4.87E-01
75-09-2	Methylene chloride	3.30E-07	1.30E-06	5.20E-05	8.11E-03
7439-97-6	Mercury	0.00E+00	0.00E+00	0.00E+00	0.00E+00
91-20-3	Naphthalene	7.90E-08	3.20E-07	1.28E-05	2.00E-03
7440-02-0	Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7697-37-2	Nitric acid	5.90E-05	2.40E-04	9.60E-03	1.50E+00
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	8.00E-11	3.20E-10	1.28E-08	2.00E-06
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00E+00	0.00E+00	0.00E+00	0.00E+00
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxine	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.40E-13	5.50E-13	2.20E-11	3.43E-09
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.70E-13	6.90E-13	2.76E-11	4.31E-09
85-01-8	Phenanthrene	4.80E-08	1.90E-07	7.60E-06	1.19E-03
108-95-2	Phenol	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7723-14-0	Phosphorus	0.00E+00	0.00E+00	0.00E+00	0.00E+00
115-07-1	Propylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
129-00-0	Pyrene	2.20E-08	8.90E-08	3.56E-06	5.55E-04
7782-49-2	Selenium			0.00E+00	0.00E+00
7440-22-4	Silver	0.00E+00	0.00E+00	0.00E+00	0.00E+00
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	6.70E-13	2.70E-12	1.08E-10	1.68E-08
7440-28-0	Thallium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108-88-3	Toluene	9.30E-09	3.70E-08	1.48E-06	2.31E-04
71-55-6	1,1,1-Trichloroethane	5.70E-06	2.30E-05	9.20E-04	1.44E-01
75-69-4	Trichlorofluoromethane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95-63-6	1,2,4-Trimethylbenzene	1.70E-06	6.90E-06	2.76E-04	4.31E-02
540-84-1	2,2,4-Trimethylpentane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440-62-2	Vanadium			0.00E+00	0.00E+00
108-05-4	Vinyl acetate	3.20E-07	1.30E-06	5.20E-05	8.11E-03
75-01-4	Vinyl Chloride			0.00E+00	0.00E+00
106-42-3, 108-38-3	m-Xylene, p-Xylene	2.30E-06	9.20E-06	3.68E-04	5.74E-02
95-47-6	o-Xylene	1.50E-06	6.10E-06	2.44E-04	3.81E-02
7440-66-6	Zinc	1.40E-05	5.80E-05	2.32E-03	3.62E-01

M032, 1 Pound Demolition Block Charge

Carbon Dioxide, Criteria Pollutants, Methane and Total Suspended Particulate

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
124-38-9	CO ₂	1.20E+00	1.20E+00	48.00	7488.00
630-08-0	Carbon Monoxide (CO)	4.80E-03	4.80E-03	0.19	29.55
7439-92-1	Lead (Pb)	2.00E-04	2.00E-04	0.01	1.25
74-82-8	Methane			0.00	0.00
-	Oxides of Nitrogen (NO _x)	1.30E-02	1.30E-02	0.52	81.12
-	PM-2.5	1.40E-02	1.40E-02	0.56	87.36
-	PM-10	2.50E-02	2.50E-02	1.00	156.00
9/5/74-6	Sulfur Dioxide (SO ₂)	4.00E-05	4.00E-05	0.00	0.25
12789-60-1	TSP	3.20E-02	3.20E-02	1.28	199.18

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
83-32-9	Acenaphthene	9.20E-09	9.20E-09	0.00	0.00
200-66-8	Acenaphthylene	1.00E-07	1.00E-07	0.00	0.00
107-13-1	Acrylonitrile	3.10E-07	3.10E-07	0.00	0.00
7429-90-5	Aluminum	9.10E-04	9.10E-04	0.04	6.60
120-12-7	Anthracene	1.20E-08	1.20E-08	0.00	0.00
7440-36-0	Antimony			0.00	0.00
7440-38-2	Arsenic			0.00	0.00
7440-39-3	Barium	6.20E-04	6.20E-04	0.02	3.07
71-43-2	Benzene	1.70E-07	1.70E-07	0.00	0.00
66-55-3	Benzofluoranthene			0.00	0.00
7440-41-7	Beryllium			0.00	0.00
106-99-0	1,3-Butadiene			0.00	0.00
71-36-3	n-Butanol			0.00	0.00
111-76-2	2-Butyn-1-ol			0.00	0.00
75-55-0	t-Butyl alcohol			0.00	0.00
85-68-7	tert-Butylphenol	1.70E-06	1.70E-06	0.00	0.01
7440-43-9	Cadmium			0.00	0.00
58-23-5	Carbon tetrachloride			0.00	0.00
74-87-3	Chloromethane	1.10E-07	1.10E-07	0.00	0.00
7440-41-3	Chromium	8.70E-06	8.70E-06	0.00	0.00
16510-39-9	Chromium hexavalent ion	2.10E-06	2.10E-06	0.00	0.01
210-01-9	Cisplatin			0.00	0.00
7440-43-4	Cobalt			0.00	0.00
7440-50-8	Copper	5.30E-04	5.30E-04	0.02	3.31
98-02-8	Cumene			0.00	0.00
110-82-7	Cyclohexane			0.00	0.00
84-74-2	Dibutyl phthalate	2.90E-06	2.90E-06	0.00	0.02
75-71-6	Dichlorodibenzomethane	1.90E-09	1.90E-09	0.00	0.00
131-11-3	Dimethyl phthalate			0.00	0.00
99-85-0	1,3-Dinitrobenzene			0.00	0.00
121-14-2	2,4-Dinitrochlorobenzene	1.50E-06	1.50E-06	0.00	0.01
605-20-2	2,6-Dinitrochlorobenzene			0.00	0.00
-	Total dinitrobenzene compounds	2.50E-10	2.50E-10	0.00	0.00
100-41-4	Ethylbenzene			0.00	0.00
74-85-1	Ethylene	5.80E-06	5.80E-06	0.00	0.04
117-01-7	bis(2-Ethylhexyl)phthalate	9.90E-06	9.90E-06	0.00	0.06
205-44-0	Fluoranthene			0.00	0.00
50-00-0	Formaldehyde			0.00	0.00
76-13-1	Freon			0.00	0.00
86-73-7	Fluorene	2.10E-08	2.10E-08	0.00	0.00
35022-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1.50E-11	1.50E-11	0.00	0.00
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1.80E-12	1.80E-12	0.00	0.00
55673-69-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.50E-13	5.50E-13	0.00	0.00
39227-20-0	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin			0.00	0.00
57653-65-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin			0.00	0.00
16408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin			0.00	0.00
70048-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran			0.00	0.00
57117-44-0	1,2,3,6,7,8-Hexachlorodibenzofuran	4.40E-13	4.40E-13	0.00	0.00
66851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.40E-13	5.40E-13	0.00	0.00
110-54-3	Hexane			0.00	0.00
74-86-0	Hydrogen cyanide	4.40E-05	4.40E-05	0.00	0.27
7439-92-1	Lead	2.00E-04	2.00E-04	0.01	1.25
7439-96-5	Manganese	4.30E-05	4.30E-05	0.00	0.27
75-05-2	Methylene chloride			0.00	0.00
7439-97-6	Mercury			0.00	0.00
91-20-3	Naphthalene	2.60E-07	2.60E-07	0.00	0.00
7440-02-0	Nickel			0.00	0.00
7697-37-2	Nitric acid	4.50E-04	4.50E-04	0.02	2.01
3260-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	2.20E-10	2.20E-10	0.00	0.00
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	3.40E-12	3.40E-12	0.00	0.00
40391-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin			0.00	0.00
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran			0.00	0.00
57117-01-4	2,3,4,7,8-Pentachlorodibenzofuran	7.00E-13	7.00E-13	0.00	0.00
85-01-6	Phenanthrene	1.30E-07	1.30E-07	0.00	0.00
100-65-2	Phenol			0.00	0.00
7723-14-0	Phosphorus			0.00	0.00
115-67-1	Propylene			0.00	0.00
129-00-0	Pyrene			0.00	0.00
7782-49-2	Selenium	3.00E-06	3.00E-06	0.00	0.10
7440-22-4	Silver			0.00	0.00
51207-31-0	2,3,7,8-Tetrachlorodibenzofuran	8.60E-13	8.60E-13	0.00	0.00
7440-28-0	Thallium			0.00	0.00
108-60-3	Toluene			0.00	0.00
21-55-0	1,1,1-Trichloroethane			0.00	0.00
75-69-4	Trichloroethylene	5.00E-10	5.00E-10	0.00	0.00
95-63-6	1,2,4-Trinitrobenzene			0.00	0.00
540-84-1	2,2,4-Trinitrophenol			0.01	0.00
7440-52-2	Vinylbenzene	2.60E-04	2.60E-04	0.01	1.62
103-05-7	Vinyl acetate			0.00	0.00
75-01-4	Vanillin	8.00E-08	8.00E-08	0.00	0.00
100-12-3					
108-38-3	m-Xylene, p-Xylene			0.00	0.00
95-47-6	o-Xylene			0.00	0.00
7440-06-6	Zinc	3.30E-04	3.30E-04	0.01	2.96

M023, M112 Demolition Block Charge

Carbon Dioxide, Criteria Pollutants, Methane and Total Suspended Particulate

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
124-38-9	CO ₂	7.90E-01	6.30E-01	2.52E+01	3931.20
630-08-0	Carbon monoxide (CO)	2.60E-02	2.10E-02	8.40E-01	131.04
7439-92-1	Lead (Pb)	1.70E-04	1.40E-04	5.60E-03	0.87
74-82-8	Methane	1.60E-03	1.30E-03	5.20E-02	8.11
--	Oxides of Nitrogen (NO _x)	7.90E-03	6.30E-03	2.52E-01	39.31
--	PM-2.5	1.90E-02	1.50E-02	6.00E-01	93.60
--	PM-10	2.60E-02	2.10E-02	8.40E-01	131.04
7446-09-5	Sulfur Dioxide (SO ₂)	1.50E-04	1.20E-04	4.80E-03	0.75
12789-66-1	TSP	3.20E-02	2.60E-02	1.04E+00	162.24

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
83-32-9	Acenaphthene	3.20E-08	2.60E-08	1.04E-06	0.00
208-96-8	Acenaphthylene	3.50E-07	2.80E-07	1.12E-05	0.00
75-05-8	Acetonitrile	1.20E-04	9.90E-05	3.96E-03	0.62
107-13-1	Acrylonitrile	9.40E-06	7.50E-06	3.00E-04	0.05
7429-90-5	Aluminum	2.10E-04	1.70E-04	6.80E-03	1.06
120-12-7	Anthracene	5.00E-08	4.00E-08	1.60E-06	0.00
7440-36-0	Antimony	2.90E-06	2.30E-06	9.20E-05	0.01
7440-39-3	Barium	5.50E-06	4.40E-06	1.76E-04	0.03
71-43-2	Benzene	1.40E-05	1.10E-05	4.40E-04	0.07
85-68-7	Butylbenzylphthalate	3.50E-06	2.80E-06	1.12E-04	0.02
7440-47-3	Chromium	9.40E-06	7.50E-06	3.00E-04	0.05
7440-50-8	Copper	1.20E-04	9.40E-05	3.76E-03	0.59
84-74-2	Dibutyl phthalate	4.30E-06	3.50E-06	1.40E-04	0.02
75-71-8	Dichlorodifluoromethane	5.10E-08	4.10E-08	1.64E-06	0.00
107-06-2	1,2-Dichloroethane	2.90E-07	2.30E-07	9.20E-06	0.00
--	Total dioxin/furan compounds	3.80E-10	3.00E-10	1.20E-08	0.00
74-85-1	Ethylene	1.30E-04	1.10E-04	4.40E-03	0.69
117-81-7	bis(2-Ethylhexyl)phthalate	1.50E-05	1.20E-05	4.80E-04	0.07
208-44-0	Fluoranthene	7.10E-08	5.70E-08	2.28E-06	0.00
86-73-7	Fluorene	1.80E-08	1.50E-08	6.00E-07	0.00
50-00-0	Formaldehyde	1.40E-04	1.10E-04	4.40E-03	0.69
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.90E-11	2.40E-11	9.60E-10	0.00
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	3.00E-12	2.40E-12	9.60E-11	0.00
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.30E-13	1.80E-13	7.20E-12	0.00
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.30E-13	1.80E-13	7.20E-12	0.00
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	5.20E-13	4.20E-13	1.68E-11	0.00
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	3.90E-13	3.10E-13	1.24E-11	0.00
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	8.10E-13	6.50E-13	2.60E-11	0.00
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.00E-13	2.40E-13	9.60E-12	0.00
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.70E-13	1.30E-13	5.20E-12	0.00
110-54-3	Hexane	4.60E-05	3.70E-05	1.48E-03	0.23
74-90-8	Hydrogen cyanide	5.30E-04	4.20E-04	1.68E-02	2.62
7439-92-1	Lead	1.70E-04	1.40E-04	5.60E-03	0.87
7439-96-5	Manganese	2.80E-05	2.30E-05	9.20E-04	0.14
75-09-2	Methylene chloride	1.90E-06	1.50E-06	6.00E-05	0.01
91-20-3	Naphthalene	2.20E-06	1.70E-06	6.80E-05	0.01
7697-37-2	Nitric acid	1.20E-03	9.90E-04	3.96E-02	6.18
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3.30E-10	2.70E-10	1.08E-08	0.00
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	6.30E-12	5.10E-12	2.04E-10	0.00
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.30E-13	1.80E-13	7.20E-12	0.00
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	9.50E-13	7.60E-13	3.04E-11	0.00
85-01-8	Phenanthrene	2.90E-07	2.30E-07	9.20E-06	0.00
115-07-1	Propylene	2.40E-05	2.00E-05	8.00E-04	0.12
129-00-0	Pyrene	1.70E-07	1.40E-07	5.60E-06	0.00
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.10E-12	9.00E-13	3.60E-11	0.00
108-88-3	Toluene	3.70E-06	3.00E-06	1.20E-04	0.02
71-55-6	1,1,1-Trichloroethane	7.60E-09	6.00E-09	2.40E-07	0.00
75-69-4	Trichlorofluoromethane	4.70E-09	3.70E-09	1.48E-07	0.00
95-63-6	1,2,4-Trimethylbenzene	2.20E-06	1.70E-06	6.80E-05	0.01
7440-66-6	Zinc	2.60E-05	2.10E-05	8.40E-04	0.13

Maximum Emissions for All Explosive Devices

Carbon Dioxide, Criteria Pollutants, Methane and Total Suspended Particulate			
CASRN	Pollutant	Maximum Daily Emissions (lbs)	Maximum Annual Emissions (lbs)
124-39-9	CO ₂	69.00	9,360
650-18-0	Carbon Monoxide (CO)	0.52	144
7439-92-1	Lead (Pb)	0.28	44
74-82-8	Mercury	0.00	0.4
-	Oxides of Nitrogen (NO _x)	0.52	81
-	PM 2.5	5.00	874
-	PM 10	7.00	112
9557-44-6	Sulfur Dioxide (SO ₂)	0.08	124
12179-66-7	TSP	13.00	2,122

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	Maximum Daily Emissions (lbs)	Maximum Annual Emissions (lbs)
812-32-9	Acetophenone	1.04E-05	1.22E-04
208-26-8	Acetophenone	1.12E-05	1.36E-03
75-07-0	Acetaldehyde	5.02E-05	6.24E-03
92-16-2	Acetophenone	6.40E-05	7.68E-03
1207-12-1	Acetophenone	4.80E-05	5.76E-03
107-02-8	Acetone	2.16E-05	2.59E-03
107-13-1	Acetophenone	2.90E-03	0.02
2429-90-5	Aluminum	4.40E-01	5.28E-04
150-15-7	Anthracene	1.02E-06	1.22E-04
7440-36-0	Antimony	2.66E-03	0.41
7440-39-7	Arsenic	3.94E-04	0.05
7440-23-3	Bismuth	7.20E-02	11.23
71-43-2	Benzene	3.00E-03	0.47
56-55-3	Benzaldehyde	4.40E-07	5.28E-05
206-19-2	Benzaldehyde	1.00E-07	1.22E-05
207-08-9	Benzaldehyde	1.00E-07	1.22E-05
191-24-2	Benzaldehyde	0.20E-09	2.44E-08
208-26-8	Benzaldehyde	7.20E-09	8.64E-08
7440-41-7	Benzene	3.10E-02	3.72E-03
105-02-0	1,3-Butadiene	4.00E-04	0.07
71-36-3	n-Butanol	1.00E-03	0.12
111-76-2	2-Butanone	1.10E-03	0.13
75-06-0	1-Butanol	6.40E-05	7.68E-03
85-08-7	Butyltinyl chloride	8.00E-04	0.14
7440-43-9	Cadmium	5.00E-04	0.03
75-15-0	Carbon disulfide	4.00E-06	4.80E-04
58-23-5	Carbon tetrachloride	6.00E-04	7.20E-03
75-00-3	Chlorobenzene	6.00E-06	7.20E-03
74-97-3	Chloroacetylene	1.50E-05	1.80E-03
7440-47-0	Chromium	3.10E-02	3.72
18540-27-0	Chromium hexacarbonyl	8.40E-05	1.00E-02
218-01-9	Chrysene	4.00E-07	4.80E-05
7440-49-4	Cobalt	3.00E-04	0.06
7440-50-8	Copper	1.00E-01	1.20E-01
58-08-1	Cuprous	1.20E-03	1.44E-03
110-05-7	Cybenzene	2.00E-04	0.02
84-74-2	Cyclopentadiene	3.00E-04	0.06
75-71-6	Dichlorodibenzofuran	1.00E-08	1.20E-06
107-05-2	1,2-Dichlorobenzene	6.00E-06	7.20E-03
131-11-3	Dimethyl phthalate	2.40E-05	0.09
65-10-6	1,2-Dinitrobenzene	2.00E-05	2.40E-03
121-14-2	2,4-Dinitrobenzene	6.00E-05	7.20E-03
65-29-2	2,6-Dinitrobenzene	4.00E-04	0.07
-	Polychlorinated biphenyls	1.12E-02	1.36E-01
109-41-4	1,2-Dichloroethane	1.24E-04	0.02
74-85-1	Ethene	6.40E-03	0.60
112-81-7	1,1,2,2-Tetrachloroethane	1.70E-03	0.27
205-44-0	Fluorobenzene	1.10E-05	1.32E-03
75-08-0	Formaldehyde	4.40E-03	0.53
75-13-4	Hydrogen	4.00E-08	4.80E-04
86-29-7	Hexene	2.40E-06	2.88E-04
30522-45-0	1,2,3,4,6,7,8-Hexachlorodibenzop-dioxin	1.00E-09	1.20E-06
87562-37-4	1,2,3,4,6,7,8-Hexachlorodibenzofuran	4.00E-09	4.80E-07
55673-89-7	1,2,3,4,7,8-Hexachlorodibenzofuran	2.00E-11	2.40E-09
30527-23-0	1,2,3,4,7,8-Hexachlorodibenzop-dioxin	3.00E-10	3.60E-08
57543-65-7	1,2,3,6,7,8-Hexachlorodibenzop-dioxin	4.00E-10	4.80E-08
18425-74-3	1,2,3,7,8-Hexachlorodibenzop-dioxin	5.00E-10	6.00E-08
10640-26-3	1,2,3,4,7,8-Hexachlorodibenzofuran	4.00E-10	4.80E-08
87112-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	2.00E-10	2.40E-08
85561-34-6	2,3,4,6,7,8-Hexachlorodibenzofuran	1.00E-10	1.20E-08
110-64-3	Heptachlor	1.00E-03	0.12
74-80-8	Hydrochloric acid	2.00E-02	2.40
163-37-6	Indane 1,2,3-diphenyl	1.00E-07	1.20E-05
7429-92-1	Lead	0.28	44
7429-90-5	Mercury	0.00	0.4
75-02-7	Methylene chloride	3.00	48.00
7430-21-6	Methane	2.12E-06	2.54E-04
91-26-3	Nitrobenzene	1.04E-04	0.06
7440-15-9	Nitric acid	1.04E-03	0.16
7637-37-2	Nitrobenzene	3.00E-02	0.36
30529-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzop-dioxin	9.40E-08	1.12E-06
30561-42-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	2.00E-09	2.40E-07
40321-76-4	1,2,3,4,7,8-Octachlorodibenzop-dioxin	1.00E-10	1.20E-08
57117-31-4	1,2,3,4,7,8-Octachlorodibenzofuran	2.20E-11	2.64E-09
57117-31-4	2,3,4,7,8-Octachlorodibenzofuran	1.50E-10	1.80E-08
85-01-9	Phenanthrene	2.00E-05	2.40E-03
100-46-2	Phenol	3.00E-04	3.60E-03
7723-14-0	Phosphorus	1.00E-02	0.12
123-39-6	Phenanthrene	2.00E-05	2.40E-03
115-07-1	Phenylene	1.20E-03	0.14
123-69-0	Pyrene	1.00E-05	1.20E-03
7782-48-2	Selenium	1.00E-04	0.01
7440-22-4	Silver	2.00E-06	2.40E-04
100-42-5	Silene	5.00E-06	6.00E-04
51267-31-3	2,3,7,8-Tetrachlorodibenzofuran	3.04E-10	3.64E-08
7440-20-0	Tellurium	2.00E-05	2.40E-03
168-88-3	Tellurium	1.00E-03	0.12
711-13-6	1,1,1-Trichloroethane	0.20E-03	0.24
75-19-4	Tetrachloroethene	1.04E-05	1.24E-03
66-63-8	1,2,4-Trinitrobenzene	2.70E-04	0.04
540-86-1	2,2,4-Trinitrobenzene	6.40E-04	0.08
7440-62-2	Vanadium	1.04E-02	1.24
107-15-4	Vinyl acetate	5.00E-05	6.00E-03
75-11-4	Vinyl chloride	2.00E-05	2.40E-03
105-45-3	m-Xylene p-Xylene	3.00E-04	0.04
103-36-3	p-Xylene	2.44E-04	0.04
7440-66-0	Zinc	0.00E-02	0.00

Notes

Particulate Dust From EOD Construction

Location	Area ¹		Duration of Construction (months) ²	Emissions Factor ³ (ton/acre/month)	Control Efficiency ⁴ (%)	Estimated Emissions Without Control (tons)	Estimated Emissions With 80% Control (tons)
	(ft ²)	acre					
Former EOD Range	31,400	0.72	1	1.2	80	0.87	0.17
Sand Hill	31,400	0.72	1	1.2	80	0.87	0.17
Huffman Flying Field	31,400	0.72	1	1.2	80	0.87	0.17

Notes:

1. Total area needed for EOD training facility is 500 radial feet. Area to be exposed during construction is assumed to be 100 radial feet
2. Duration of construction is assumed to be 3 months for Sand Hill and Huffman Flying Field but 6 months for Former EOD Range as considerable grubbing would be needed prior to construction of EOD facilities
3. Section 13.2.3 "Heavy Construction Operations" dated (1/95), of AP-42 "Compilation of Air Pollutant Emission Factors, 5th Edition, U.S. EPA, Research Triangle Park, NC, 1998
4. Control efficiency assumed is from Section 13.2.2 "Unpaved Roads" dated 11/05, of AP-42 "Compilation of Air Pollutant Emission Factors, 5th Edition, U.S. EPA, Research Triangle Park, NC, 1998

rk, NC, 1998

G900,TH3 AN-M14 Incendiary Grenade

Carbon Dioxide, Criteria Pollutants, Methane and Total Suspended Particulate

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
124-38-9	CO ₂	2.10E-02	1.40E-02	5.60E-01	87.36
630-08-0	Carbon Monoxide (CO)	8.00E-04	5.10E-04	2.04E-02	3.18
7439-92-1	Lead (Pb)	1.10E-02	7.00E-03	2.80E-01	43.68
74-82-8	Methane	1.20E-05	7.90E-06	3.16E-04	0.05
-	Oxides of Nitrogen (NO _x)	6.70E-04	4.30E-04	1.72E-02	2.68
-	PM 2.5	4.90E-02	3.10E-02	1.24E+00	193.44
-	PM 10	7.00E-02	4.50E-02	1.80E+00	280.80
7446-09-5	SO ₂	2.60E-02	1.70E-02	6.80E-01	106.08
12789-66-1	TSP	6.80E-02	4.40E-02	1.76E+00	274.56

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
83-32-9	Acenaphthene	4.20E-09	2.70E-09	1.08E-07	0.00
208-96-8	Acenaphthylene	3.20E-08	2.10E-08	8.40E-07	0.00
75-07-0	Acetaldehyde	2.10E-06	1.40E-06	5.60E-05	0.01
75-05-8	Acetonitrile	1.60E-07	1.00E-07	4.00E-06	0.00
98-86-2	Acetophenone	2.50E-06	1.60E-06	6.40E-05	0.01
107-02-8	Acrolein	8.30E-07	5.40E-07	2.16E-05	0.00
7429-90-5	Aluminum	4.80E-03	3.10E-03	1.24E-01	19.34
120-12-7	Anthracene	2.40E-09	1.60E-09	6.40E-08	0.00
7440-39-3	Barium	2.80E-03	1.80E-03	7.20E-02	11.23
71-43-2	Benzene	2.00E-06	1.30E-06	5.20E-05	0.01
56-55-3	Benzo[a]anthracene	2.40E-09	1.60E-09	6.40E-08	0.00
205-99-2	Benzo[b]fluoranthene	6.20E-09	4.00E-09	1.60E-07	0.00
207-08-9	Benzo[k]fluoranthene	3.90E-09	2.50E-09	1.00E-07	0.00
191-24-2	Benzo[g,h,i]perylene	3.60E-09	2.30E-09	9.20E-08	0.00
50-32-8	Benzo[a]pyrene	2.70E-09	1.80E-09	7.20E-08	0.00
75-15-0	Carbon disulfide	1.60E-07	1.00E-07	4.00E-06	0.00
75-00-3	Chloroethane	2.60E-07	1.70E-07	6.80E-06	0.00
74-87-3	Chloromethane	7.50E-08	4.80E-08	1.92E-06	0.00
7440-47-3	Chromium	5.40E-06	3.50E-06	1.40E-04	0.02
218-01-9	Chrysene	4.60E-09	3.00E-09	1.20E-07	0.00
7440-50-8	Copper	5.20E-05	3.40E-05	1.36E-03	0.21
75-71-8	Dichlorodifluoromethane	4.60E-08	2.90E-08	1.16E-06	0.00
117-81-7	bis(2-Ethylhexyl)phthalate	3.60E-05	2.30E-05	9.20E-04	0.14
206-44-0	Fluoranthene	7.80E-09	5.00E-09	2.00E-07	0.00
86-73-7	Fluorene	1.00E-08	6.60E-09	2.64E-07	0.00
74-90-8	Hydrogen cyanide	4.90E-06	3.20E-06	1.28E-04	0.02
193-39-5	Indeno[1,2,3-cd]pyrene	3.90E-09	2.50E-09	1.00E-07	0.00
7439-92-1	Lead	1.10E-02	7.00E-03	2.80E-01	43.68
7439-96-5	Manganese	1.20E-04	7.80E-05	3.12E-03	0.49
75-09-2	Methylene chloride	3.10E-07	2.00E-07	8.00E-06	0.00
91-20-3	Naphthalene	3.90E-07	2.50E-07	1.00E-05	0.00
85-01-8	Phenanthrene	1.50E-08	9.60E-09	3.84E-07	0.00
108-95-2	Phenol	2.50E-06	1.60E-06	6.40E-05	0.01
123-38-6	Propionaldehyde	1.10E-06	6.90E-07	2.76E-05	0.00
129-00-0	Pyrene	7.00E-09	4.50E-09	1.80E-07	0.00
100-42-5	Styrene	1.90E-07	1.30E-07	5.20E-06	0.00
108-88-3	Toluene	2.10E-07	1.30E-07	5.20E-06	0.00
7440-66-6	Zinc	2.40E-05	1.60E-05	6.40E-04	0.10

M030, 1/4 Pound Demolition Block Charge

Carbon Dioxide, Criteria Pollutants, Methane and Total Suspended Particulate

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
124-38-9	CO ₂	3.40E-01	1.4	56	8736
630-08-0	Carbon Monoxide (CO)	5.00E-03	2.00E-02	0.8	124.8
7439-92-1	Lead (Pb)	1.40E-04	5.60E-04	0.0224	3.4944
74-82-8	Methane	2.00E-05	8.10E-05	0.00324	0.50544
-	Oxides of Nitrogen (NO _x)	3.00E-03	1.20E-02	0.48	74.88
-	PM-2.5	4.60E-03	1.90E-02	0.76	118.56
-	PM-10	1.20E-02	5.00E-02	2	312
9/57446	Sulfur Dioxide (SO ₂)	8.10E-05	3.20E-04	0.0128	1.9968
12789-66-1	TSP	1.70E-02	6.70E-02	2.68	418.08

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
83-32-9	Acenaphthene	4.90E-09	2.00E-08	8.00E-07	1.25E-04
208-96-8	Acenaphthylene	3.80E-08	1.50E-07	6.00E-06	9.36E-04
107-13-1	Acrylonitrile	5.80E-07	2.30E-06	9.20E-05	1.44E-02
7429-90-5	Aluminum	2.70E-04	1.10E-03	4.40E-02	6.86E+00
120-12-7	Anthracene	7.00E-09	2.80E-08	1.12E-06	1.75E-04
7440-36-0	Antimony	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440-38-2	Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440-39-3	Barium	1.50E-04	5.90E-04	2.36E-02	3.68E+00
71-43-2	Benzene	2.90E-07	1.20E-06	4.80E-05	7.49E-03
56-55-3	Benzo[a]anthracene	2.70E-09	1.10E-08	4.40E-07	6.86E-05
7440-41-7	Beryllium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106-99-0	1,3 Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
71-36-3	n-Butanol	6.30E-06	2.50E-05	1.00E-03	1.56E-01
111-76-2	2-Butoxyethanol	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75-65-0	1-Butyl alcohol	3.90E-07	1.60E-06	6.40E-05	9.98E-03
85-68-7	Butylbenzylphthalate	5.50E-06	2.20E-05	8.80E-04	1.37E-01
7440-43-9	Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
56-23-5	Carbon tetrachloride	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74-87-3	Chloromethane	6.60E-08	2.60E-07	1.04E-05	1.62E-03
7440-47-3	Chromium	5.40E-06	2.20E-05	8.80E-04	1.37E-01
18540-29-9	Chromium hexavalent ion			0.00E+00	0.00E+00
218-01-9	Chrysene	2.60E-09	1.00E-08	4.00E-07	6.24E-05
7440-48-4	Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440-50-8	Copper	1.20E-04	4.70E-04	1.88E-02	2.93E+00
98-82-8	Cumene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
110-82-7	Cyclohexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
84-74-2	Dibutyl phthalate	2.20E-06	8.90E-06	3.56E-04	5.55E-02
75-71-8	Dichlorodifluoromethane	3.70E-09	1.50E-08	6.00E-07	9.36E-05
131-11-3	Dimethyl phthalate	0.00E+00	0.00E+00	0.00E+00	0.00E+00
99-65-0	1,3-Dinitrobenzene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
121-14-2	2,4-Dinitrotoluene	3.60E-07	1.40E-06	5.60E-05	8.74E-03
606-20-2	2,6-Dinitrotoluene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
-	Total dioxin/furan compounds	8.90E-11	3.60E-10	1.44E-08	2.25E-06
100-41-4	Ethylbenzene	7.60E-07	3.10E-06	1.24E-04	1.93E-02
74-85-1	Ethylene	6.50E-06	2.60E-05	1.04E-03	1.62E-01
117-81-7	bis(2-Ethylhexyl)phthalate	3.70E-06	1.50E-05	6.00E-04	9.36E-02
206-44-0	Fluoranthene	1.20E-08	4.90E-08	1.95E-06	3.06E-04
50-00-0	Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00
76-13-1	Freon	0.00E+00	0.00E+00	0.00E+00	0.00E+00
86-73-7	Fluorene	1.50E-08	6.00E-08	2.40E-06	3.74E-04
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	6.40E-12	2.50E-11	1.00E-09	1.56E-07
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	9.70E-13	3.90E-12	1.56E-10	2.43E-08
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1.30E-13	5.10E-13	2.04E-11	3.18E-09
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	3.30E-13	1.30E-12	5.20E-11	8.11E-09

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.40E-13	9.70E-13	3.88E-11	6.05E-09
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	1.90E-13	7.80E-13	3.12E-11	4.87E-09
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	1.30E-13	5.10E-13	2.04E-11	3.18E-09
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	6.70E-14	2.70E-13	1.08E-11	1.68E-09
110-54-3	Hexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74-90-8	Hydrogen cyanide	1.30E-04	5.20E-04	2.08E-02	3.24E+00
7439-92-1	Lead	1.40E-04	5.60E-04	2.24E-02	3.49E+00
7439-96-5	Manganese	1.90E-05	7.80E-05	3.12E-03	4.87E-01
75-09-2	Methylene chloride	3.30E-07	1.30E-06	5.20E-05	8.11E-03
7439-97-6	Mercury	0.00E+00	0.00E+00	0.00E+00	0.00E+00
91-20-3	Naphthalene	7.90E-08	3.20E-07	1.28E-05	2.00E-03
7440-02-0	Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7697-37-2	Nitric acid	5.90E-05	2.40E-04	9.60E-03	1.50E+00
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	8.00E-11	3.20E-10	1.28E-08	2.00E-06
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00E+00	0.00E+00	0.00E+00	0.00E+00
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxine	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	1.40E-13	5.50E-13	2.20E-11	3.43E-09
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.70E-13	6.90E-13	2.76E-11	4.31E-09
85-01-8	Phenanthrene	4.80E-08	1.90E-07	7.60E-06	1.19E-03
108-95-2	Phenol	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7723-14-0	Phosphorus	0.00E+00	0.00E+00	0.00E+00	0.00E+00
115-07-1	Propylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
129-00-0	Pyrene	2.20E-08	8.90E-08	3.56E-06	5.55E-04
7782-49-2	Selenium			0.00E+00	0.00E+00
7440-22-4	Silver	0.00E+00	0.00E+00	0.00E+00	0.00E+00
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	6.70E-13	2.70E-12	1.08E-10	1.68E-08
7440-28-0	Thallium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108-88-3	Toluene	9.30E-09	3.70E-08	1.48E-06	2.31E-04
71-55-6	1,1,1-Trichloroethane	5.70E-06	2.30E-05	9.20E-04	1.44E-01
75-69-4	Trichlorofluoromethane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95-63-6	1,2,4-Trimethylbenzene	1.70E-06	6.90E-06	2.76E-04	4.31E-02
540-84-1	2,2,4-Trimethylpentane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440-62-2	Vanadium			0.00E+00	0.00E+00
108-05-4	Vinyl acetate	3.20E-07	1.30E-06	5.20E-05	8.11E-03
75-01-4	Vinyl Chloride			0.00E+00	0.00E+00
106-42-3, 108-38-3	m-Xylene, p-Xylene	2.30E-06	9.20E-06	3.68E-04	5.74E-02
95-47-6	o-Xylene	1.50E-06	6.10E-06	2.44E-04	3.81E-02
7440-66-6	Zinc	1.40E-05	5.80E-05	2.32E-03	3.62E-01

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
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M032, 1 Pound Demolition Block Charge

Carbon Dioxide, Criteria Pollutants, Methane and Total Suspended Particulate

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
124-38-9	CO ₂	1.20E+00	1.20E+00	48.00	7488.00
630-08-0	Carbon Monoxide (CO)	4.80E-03	4.80E-03	0.19	29.95
7439-92-1	Lead (Pb)	2.00E-04	2.00E-04	0.01	1.25
74-82-8	Methane			0.00	0.00
-	Oxides of Nitrogen (NO _x)	1.30E-02	1.30E-02	0.52	81.12
-	PM-2.5	1.40E-02	1.40E-02	0.56	87.36
-	PM-10	2.50E-02	2.50E-02	1.00	156.00
9/5/7446	Sulfur Dioxide (SO ₂)	4.00E-05	4.00E-05	0.00	0.25
12789-66-1	TSP	3.20E-02	3.20E-02	1.28	199.68

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
83-32-9	Acenaphthene	9.20E-09	9.20E-09	0.00	0.00
208-96-8	Acenaphthylene	1.00E-07	1.00E-07	0.00	0.00
107-13-1	Acrylonitrile	3.10E-07	3.10E-07	0.00	0.00
7429-90-5	Aluminum	9.10E-04	9.10E-04	0.04	5.68
120-12-7	Anthracene	1.20E-08	1.20E-08	0.00	0.00
7440-36-0	Antimony			0.00	0.00
7440-38-2	Arsenic			0.00	0.00
7440-39-3	Barium	6.20E-04	6.20E-04	0.02	3.87
71-43-2	Benzene	1.70E-07	1.70E-07	0.00	0.00
56-55-3	Benzo[a]anthracene			0.00	0.00
7440-41-7	Beryllium			0.00	0.00
106-99-0	1,3 Butadiene			0.00	0.00
71-36-3	n-Butanol			0.00	0.00
111-76-2	2-Butoxyethanol			0.00	0.00
75-65-0	t-Butyl alcohol			0.00	0.00
85-68-7	Butylbenzylphthalate	1.70E-06	1.70E-06	0.00	0.01
7440-43-9	Cadmium			0.00	0.00
56-23-5	Carbon tetrachloride			0.00	0.00
74-87-3	Chloromethane	1.10E-07	1.10E-07	0.00	0.00
7440-47-3	Chromium	8.70E-06	8.70E-06	0.00	0.05
18540-29-9	Chromium hexavalent ion	2.10E-06	2.10E-06	0.00	0.01
218-01-9	Chrysene			0.00	0.00
7440-48-4	Cobalt			0.00	0.00
7440-50-8	Copper	5.30E-04	5.30E-04	0.02	3.31
98-82-8	Cumene			0.00	0.00
110-82-7	Cyclohexane			0.00	0.00
84-74-2	Dibutyl phthalate	2.90E-06	2.90E-06	0.00	0.02
75-71-8	Dichlorodifluoromethane	1.00E-09	1.00E-09	0.00	0.00
131-11-3	Dimethyl phthalate			0.00	0.00
99-65-0	1,3-Dinitrobenzene			0.00	0.00
121-14-2	2,4-Dinitrotoluene	1.50E-06	1.50E-06	0.00	0.01
606-20-2	2,6-Dinitrotoluene			0.00	0.00
--	Total dioxin/furan compounds	2.50E-10	2.50E-10	0.00	0.00
100-41-4	Ethylbenzene			0.00	0.00
74-85-1	Ethylene	5.80E-06	5.80E-06	0.00	0.04
117-81-7	bis(2-Ethylhexyl)phthalate	9.90E-06	9.90E-06	0.00	0.06
206-44-0	Fluoranthene			0.00	0.00
50-00-0	Formaldehyde			0.00	0.00
76-13-1	Freon			0.00	0.00
86-73-7	Fluorene	2.10E-08	2.10E-08	0.00	0.00
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1.50E-11	1.50E-11	0.00	0.00
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1.80E-12	1.80E-12	0.00	0.00
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	5.50E-13	5.50E-13	0.00	0.00
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin			0.00	0.00
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin			0.00	0.00

19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin			0.00	0.00
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran			0.00	0.00
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	4.40E-13	4.40E-13	0.00	0.00
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	5.40E-13	5.40E-13	0.00	0.00
110-54-3	Hexane			0.00	0.00
74-90-8	Hydrogen cyanide	4.40E-05	4.40E-05	0.00	0.27
7439-92-1	Lead	2.00E-04	2.00E-04	0.01	1.25
7439-96-5	Manganese	4.30E-05	4.30E-05	0.00	0.27
75-09-2	Methylene chloride			0.00	0.00
7439-97-6	Mercury			0.00	0.00
91-20-3	Naphthalene	2.60E-07	2.60E-07	0.00	0.00
7440-02-0	Nickel			0.00	0.00
7697-37-2	Nitric acid	4.50E-04	4.50E-04	0.02	2.81
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	2.20E-10	2.20E-10	0.00	0.00
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	3.40E-12	3.40E-12	0.00	0.00
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxine			0.00	0.00
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran			0.00	0.00
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	7.00E-13	7.00E-13	0.00	0.00
85-01-8	Phenanthrene	1.30E-07	1.30E-07	0.00	0.00
108-95-2	Phenol			0.00	0.00
7723-14-0	Phosphorus			0.00	0.00
115-07-1	Propylene			0.00	0.00
129-00-0	Pyrene			0.00	0.00
7782-49-2	Selenium	3.80E-06	3.80E-06	0.00	0.02
7440-22-4	Silver			0.00	0.00
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	8.60E-13	8.60E-13	0.00	0.00
7440-28-0	Thallium			0.00	0.00
108-88-3	Toluene			0.00	0.00
71-55-6	1,1,1-Trichloroethane			0.00	0.00
75-69-4	Trichlorofluoromethane	5.80E-10	5.80E-10	0.00	0.00
95-63-6	1,2,4-Trimethylbenzene			0.00	0.00
540-84-1	2,2,4-Trimethylpentane			0.00	0.00
7440-62-2	Vanadium	2.60E-04	2.60E-04	0.01	1.62
108-05-4	Vinyl acetate			0.00	0.00
75-01-4	Vinyl Chloride	8.00E-08	8.00E-08	0.00	0.00
106-42-3,	m-Xylene, p-Xylene			0.00	0.00
108-38-3					
95-47-6	o-Xylene			0.00	0.00
7440-66-6	Zinc	3.30E-04	3.30E-04	0.01	2.06

M023, M112 Demolition Block Charge

Carbon Dioxide, Criteria Pollutants, Methane and Total Suspended Particulate

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
124-38-9	CO ₂	7.90E-01	6.30E-01	2.52E+01	3931.20
630-08-0	Carbon monoxide (CO)	2.60E-02	2.10E-02	8.40E-01	131.04
7439-92-1	Lead (Pb)	1.70E-04	1.40E-04	5.60E-03	0.87
74-82-8	Methane	1.60E-03	1.30E-03	5.20E-02	8.11
--	Oxides of Nitrogen (NO _x)	7.90E-03	6.30E-03	2.52E-01	39.31
--	PM-2.5	1.90E-02	1.50E-02	6.00E-01	93.60
--	PM-10	2.60E-02	2.10E-02	8.40E-01	131.04
7446-09-5	Sulfur Dioxide (SO ₂)	1.50E-04	1.20E-04	4.80E-03	0.75
12789-66-1	TSP	3.20E-02	2.60E-02	1.04E+00	162.24

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	lb per item ¹	lb per lb NEW ¹	Emissions for 40 lbs NEW Detonated (lbs)	Annual Emissions (lbs)
83-32-9	Acenaphthene	3.20E-08	2.60E-08	1.04E-06	0.00
208-96-8	Acenaphthylene	3.50E-07	2.80E-07	1.12E-05	0.00
75-05-8	Acetonitrile	1.20E-04	9.90E-05	3.96E-03	0.62
107-13-1	Acrylonitrile	9.40E-06	7.50E-06	3.00E-04	0.05
7429-90-5	Aluminum	2.10E-04	1.70E-04	6.80E-03	1.06
120-12-7	Anthracene	5.00E-08	4.00E-08	1.60E-06	0.00
7440-36-0	Antimony	2.90E-06	2.30E-06	9.20E-05	0.01
7440-39-3	Barium	5.50E-06	4.40E-06	1.76E-04	0.03
71-43-2	Benzene	1.40E-05	1.10E-05	4.40E-04	0.07
85-68-7	Butylbenzylphthalate	3.50E-06	2.80E-06	1.12E-04	0.02
7440-47-3	Chromium	9.40E-06	7.50E-06	3.00E-04	0.05
7440-50-8	Copper	1.20E-04	9.40E-05	3.76E-03	0.59
84-74-2	Dibutyl phthalate	4.30E-06	3.50E-06	1.40E-04	0.02
75-71-8	Dichlorodifluoromethane	5.10E-08	4.10E-08	1.64E-06	0.00
107-06-2	1,2-Dichloroethane	2.90E-07	2.30E-07	9.20E-06	0.00
--	Total dioxin/furan compounds	3.80E-10	3.00E-10	1.20E-08	0.00
74-85-1	Ethylene	1.30E-04	1.10E-04	4.40E-03	0.69
117-81-7	bis(2-Ethylhexyl)phthalate	1.50E-05	1.20E-05	4.80E-04	0.07
206-44-0	Fluoranthene	7.10E-08	5.70E-08	2.28E-06	0.00
86-73-7	Fluorene	1.80E-08	1.50E-08	6.00E-07	0.00
50-00-0	Formaldehyde	1.40E-04	1.10E-04	4.40E-03	0.69
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.90E-11	2.40E-11	9.60E-10	0.00
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	3.00E-12	2.40E-12	9.60E-11	0.00
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.30E-13	1.80E-13	7.20E-12	0.00
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.30E-13	1.80E-13	7.20E-12	0.00
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	5.20E-13	4.20E-13	1.68E-11	0.00
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	3.90E-13	3.10E-13	1.24E-11	0.00
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	8.10E-13	6.50E-13	2.60E-11	0.00
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.00E-13	2.40E-13	9.60E-12	0.00
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	1.70E-13	1.30E-13	5.20E-12	0.00
110-54-3	Hexane	4.60E-05	3.70E-05	1.48E-03	0.23
74-90-8	Hydrogen cyanide	5.30E-04	4.20E-04	1.68E-02	2.62
7439-92-1	Lead	1.70E-04	1.40E-04	5.60E-03	0.87
7439-96-5	Manganese	2.80E-05	2.30E-05	9.20E-04	0.14
75-09-2	Methylene chloride	1.90E-06	1.50E-06	6.00E-05	0.01
91-20-3	Naphthalene	2.20E-06	1.70E-06	6.80E-05	0.01
7697-37-2	Nitric acid	1.20E-03	9.90E-04	3.96E-02	6.18
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3.30E-10	2.70E-10	1.08E-08	0.00
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	6.30E-12	5.10E-12	2.04E-10	0.00
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.30E-13	1.80E-13	7.20E-12	0.00
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	9.50E-13	7.60E-13	3.04E-11	0.00
85-01-8	Phenanthrene	2.90E-07	2.30E-07	9.20E-06	0.00
115-07-1	Propylene	2.40E-05	2.00E-05	8.00E-04	0.12
129-00-0	Pyrene	1.70E-07	1.40E-07	5.60E-06	0.00
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	1.10E-12	9.00E-13	3.60E-11	0.00

108-88-3	Toluene	3.70E-06	3.00E-06	1.20E-04	0.02
71-55-6	1,1,1-Trichloroethane	7.60E-09	6.00E-09	2.40E-07	0.00
75-69-4	Trichlorofluoromethane	4.70E-09	3.70E-09	1.48E-07	0.00
95-63-6	1,2,4-Trimethylbenzene	2.20E-06	1.70E-06	6.80E-05	0.01
7440-66-6	Zinc	2.60E-05	2.10E-05	8.40E-04	0.13

Maximum Emissions for All Explosive Devices

Carbon Dioxide, Criteria Pollutants, Methane and Total Suspended Particulate

CASRN	Pollutant	Maximum Daily Emissions (lbs)	Maximum Annual Emissions (lbs)
124-38-9	CO ₂	60.00	9,360
630-08-0	Carbon Monoxide (CO)	0.92	144
7439-92-1	Lead (Pb)	0.28	44
74-82-8	Methane	0.60	94
-	Oxides of Nitrogen (NO _x)	0.52	81
-	PM-2.5	5.60	874
-	PM-10	2.00	312
9/577446	Sulfur Dioxide (SO ₂)	0.68	106
12789-66-1	TSP	13.60	2,122

Hazardous Air Pollutants and Toxic Chemicals

CASRN	Pollutant	Maximum Daily Emissions (lbs)	Maximum Annual Emissions (lbs)
83-32-9	Acenaphthene	1.04E-06	1.62E-04
208-96-8	Acenaphthylene	1.12E-05	1.75E-03
75-07-0	Acetaldehyde	5.60E-05	8.74E-03
98-86-2	Acetophenone	6.40E-05	9.98E-03
107-13-1	Acetonitrile	4.00E-06	6.24E-04
107-02-8	Acrolein	2.16E-05	3.37E-03
107-13-1	Acrylonitrile	3.96E-03	0.62
7429-90-5	Aluminum	4.40E-01	68.64
120-12-7	Anthracene	1.60E-06	2.50E-04
7440-36-0	Antimony	2.60E-03	0.41
7440-38-2	Arsenic	3.84E-04	0.06
7440-39-3	Barium	7.20E-02	11.23
71-43-2	Benzene	3.00E-03	0.47
56-55-3	Benzo[a]anthracene	4.40E-07	6.86E-05
205-99-2	Benzo[b]fluoranthene	1.60E-07	2.50E-05
207-08-9	Benzo[k]fluoranthene	1.00E-07	1.56E-05
191-24-2	Benzo[g,h,i]perylene	9.20E-08	1.44E-05
50-32-8	Benzo[a]pyrene	7.20E-08	1.12E-05
7440-41-7	Beryllium	3.16E-05	4.93E-03
106-99-0	1,3 Butadiene	4.80E-04	0.07
71-36-3	n-Butanol	1.00E-03	0.16
111-76-2	2-Butoxyethanol	1.16E-03	0.18
75-65-0	t-Butyl alcohol	6.40E-05	9.98E-03
85-68-7	Butylbenzylphthalate	8.80E-04	0.14
7440-43-9	Cadmium	5.60E-04	0.09
75-15-0	Carbon disulfide	4.00E-06	6.24E-04
56-23-5	Carbon tetrachloride	6.00E-05	9.36E-03
75-00-3	Chloroethane	6.80E-06	1.06E-03
74-87-3	Chloromethane	1.04E-05	1.62E-03
7440-47-3	Chromium	3.16E-02	4.93
18540-29-9	Chromium hexavalent ion	8.40E-05	1.31E-02
218-01-9	Chrysene	4.00E-07	6.24E-05
7440-48-4	Cobalt	3.56E-04	0.06
7440-50-8	Copper	1.28E-01	2.00E+01
98-82-8	Cumene	7.20E-05	1.12E-02
110-82-7	Cyclohexane	3.84E-04	0.06
84-74-2	Dibutyl phthalate	3.56E-04	0.06
75-71-8	Dichlorodifluoromethane	1.64E-06	2.56E-04
107-06-2	1,2-Dichloroethane	9.20E-06	1.44E-03
131-11-3	Dimethyl phthalate	2.48E-05	0.00
99-65-0	1,3-Dinitrobenzene	2.36E-05	3.68E-03
121-14-2	2,4-Dinitrotoluene	6.00E-05	9.36E-03
606-20-2	2,6-Dinitrotoluene	4.80E-04	0.07
--	Total dioxin/furan compounds	1.12E-07	1.75E-05
100-41-4	Ethylbenzene	1.24E-04	0.02
74-85-1	Ethylene	6.40E-03	1.00
117-81-7	bis(2-Ethylhexyl)phthalate	1.76E-03	0.27
206-44-0	Fluoranthene	1.16E-05	1.81E-03

50-00-0	Formaldehyde	4.40E-03	0.69
76-13-1	Freon	4.00E-06	6.24E-04
86-73-7	Fluorene	2.40E-06	3.74E-04
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1.08E-08	1.68E-06
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran	4.80E-09	7.49E-07
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	2.20E-11	3.43E-09
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	3.00E-10	4.68E-08
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	4.00E-10	6.24E-08
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	5.20E-10	8.11E-08
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	4.80E-10	7.49E-08
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	3.00E-10	4.68E-08
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	3.80E-10	5.93E-08
110-54-3	Hexane	1.48E-03	0.23
74-90-8	Hydrogen cyanide	2.08E-02	3.24
193-39-5	Indeno[1,2,3-cd]pyrene	1.00E-07	1.56E-05
7439-92-1	Lead	0.28	43.68
7439-96-5	Manganese	9.60E-03	1.50
75-09-2	Methylene chloride	3.00	466.00
7439-97-6	Mercury	2.72E-06	4.24E-04
91-20-3	Naphthalene	3.04E-04	0.05
7440-02-0	Nickel	1.04E-03	0.16
7697-37-2	Nitric acid	3.96E-02	6.18
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	8.40E-08	1.31E-05
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	7.20E-09	1.12E-06
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1.88E-10	2.93E-08
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	2.20E-11	3.43E-09
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	1.52E-10	2.37E-08
85-01-8	Phenanthrene	2.84E-05	4.43E-03
108-95-2	Phenol	3.08E-04	4.80E-02
7723-14-0	Phosphorus	1.40E-02	2.18
123-38-6	Propionaldehyde	2.76E-05	4.31E-03
115-07-1	Propylene	1.72E-03	0.27
129-00-0	Pyrene	1.08E-05	1.68E-03
7782-49-2	Selenium	1.52E-04	0.02
7440-22-4	Silver	2.68E-05	4.18E-03
100-42-5	Styrene	5.20E-06	8.11E-04
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	3.04E-10	4.74E-08
7440-28-0	Thallium	2.08E-05	3.24E-03
108-88-3	Toluene	1.88E-03	0.29
71-55-6	1,1,1-Trichloroethane	9.20E-04	0.14
75-69-4	Trichlorofluoromethane	1.96E-05	3.06E-03
95-63-6	1,2,4-Trimethylbenzene	2.76E-04	0.04
540-84-1	2,2,4-Trimethylpentane	6.40E-04	0.10
7440-62-2	Vanadium	1.04E-02	1.62
108-05-4	Vinyl acetate	5.20E-05	8.11E-03
75-01-4	Vinyl Chloride	3.20E-06	4.99E-04
106-42-3			
106-38-3	m-Xylene, p-Xylene	3.68E-04	0.06
95-47-6	o-Xylene	2.44E-04	0.04
7440-66-6	Zinc	6.80E-02	10.61

Notes:

Particulate Dust From EOD Construction

Location	Area ¹		Duration of Construction (months) ²	Emissions Factor ³ (ton/acre/month)	Control Efficiency ⁴ (%)	Estimated Emissions Without Control (tons)	Estimated Emissions With 80% Control (tons)
	(ft ²)	acre					
Former EOD Range	31,400	0.72	1	1.2	80	0.87	0.17
Sand Hill	31,400	0.72	1	1.2	80	0.87	0.17
Huffman Flying Field	31,400	0.72	1	1.2	80	0.87	0.17

Notes:

1. Total area needed for EOD training facility is 500 radial feet. Area to be exposed during construction is assumed to be 100 radial feet
2. Duration of construction is assumed to be 3 months for Sand Hill and Huffman Flying Field but 6 months for Former EOD Range as considerable grubbing would be needed prior to construction of EOD facilities
3. Section 13.2.3 "Heavy Construction Operations" dated (1/95), of AP-42 "Compilation of Air Pollutant Emission Factors, 5th Edition, U.S. EPA, Research Triangle Park, NC, 1998
4. Control efficiency assumed to be from Section 13.2.2 "Unpaved Roads" dated 11/06, of AP-42 "Compilation of Air Pollutant Emission Factors, 5th Edition, U.S. EPA, Research Triangle Park, NC, 1998

rk, NC, 1998

APPENDIX E

BLAST OVERPRESSURE CALCULATIONS

**Blast Effects on the Environment
Around 5# C-4
Detonation Bunker**

The subject bunker blast environment was analyzed for the blast effects of a 5# C-4 ground burst in a 6' high vented concrete bunker. The analysis results on the bunker and its surrounding, up to 100' standoff distance from the burst point are as follows:

- 1. Subjected to the maximum shock effects of 31.69 psi incident overpressure, 24.96 psi-ms impulse, 101.39 psi reflected pressure and 65.48 psi-ms reflected impulse the bunker walls had no damage.**
- 2. At a 100' standoff distance from the burst point, no blast effects were recorded. The shock front had dissipated to nothing. People asset located at this distance from the detonation point had no injury from the blast.**

See the attachment for detail.

**Victor Erewele, MS. PE.
Structural Engineer.**

3/27/2009

Blast/FX Summary Report

Wednesday, March 18, 2009

Building

No. of Levels: 1

BUNKER

Height: 6.0 (ft)

Elevation: 0.0 (ft)

No. of Components: 6

Population: 4

Scenario

Name: 5#-C4 AT DETONATION

Description: 5#-C4 AT DETONATION

Device: 5#-C4

Description: 5#-C4

Compound: Composition C-4

Charge: 5.0 (lbs)

TNT Equiv: 6.4 (lbs)

Case Wt: 1.0 (lbs)

V Initial: 10518 (fps)

Device Position: (0.0, 0.0, 0.0) (ft)

Population Set: POEPLA AT 100 FEET

Description: PERSONS AT 100' DISTANCE FROM DETONATION POINT.

No. of People: 4

Casualties

Fatalities: 0 / 0%

Serious Injuries: 0 / 0%

Slight Injuries: 0 / 0%

Uninjured: 4 / 100%

Damage

	Destroyed	Severe	Moderate	Undamaged	Total
Beams	0	0	0	0	0
Columns	0	0	0	0	0
Floors	0	0	0	0	0
Walls	0	0	0	6	6
Total	0	0	0	6	6

Glass Lites: 0

Broken: 0

Blast/FX v2.2: Query Results

Pos: 0.1, 99.8

Overpressure : 0.00 psi
Impulse : 0.00 psi-ms
Duration : 0.00 ms
Fragment Density : 0.00 per sq ft
Distance from Device : 99.81 ft

Hazard Severities:

Overpressure : NONE
Fragmentation : NONE
Glass : NONE
Debris : NONE
Collapse : NONE

Injury Probabilities:

	At least Slight	At least Serious	Fatal
Overpressure	0.000	0.000	0.000
Fragmentation	0.000	0.000	0.000
Glass	0.000	0.000	0.000
Debris	0.000	0.000	0.000
Collapse	0.000	0.000	0.000

Overall	0.000	0.000	0.000

Blast/FX v2.2: Query Results

Type: WALL (BUNKER WALL)

Pos: -26.0, 10.5

Overpressure	: 31.69 psi
Impulse	: 24.96 psi-ms
Duration	: 3.03 ms
Fragment Density	: 0.40 per sq ft
Distance from Device	: 10.50 ft
Reflected Pressure	: 101.39
Reflected Impulse	: 65.48
Glass Fragmentation	: n/a
Glass Breaking Pres.	: 1.00

Damage : 0%

Collapsed : NO

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